IMPLEMENTING TOTAL QUALITY MANAGEMENT APPROACH IN GARMENTS INDUSTRY

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Abstract

Rapid developments in international competition have obliged textile enterprises to take new approaches in order to gain a competitive advantage. The limits of acceptable quality levels for the enterprises have fallen back down to critical points due to the effects of liberal policies in international markets. Total Quality Management (TQM) keeps vital role in improving productivity, product quality and reduces manufacturing cost by reducing rework and scrape. TQM method has a great applicability in RMG sector. As RMG sector is the largest industrial sector of Bangladesh, Product Quality improvement can play a vital role in opening the doors of great opportunities for the country. To perform this study we take help of the tools of TQM such as Flow chart, Check sheet, Histogram, Pareto Chart, Scatter Diagram, Control Chart, Cause and effect diagram from various garment industries of Bangladesh to analyse collected data which were collected through observation method and it is found that a significant amount of rework and scrape per style, per month has minimized by applying this method. Implementing Total quality control applications are gaining in importance because the textile & apparel sector is a sector in which consumer expectations and preferences are of primary importance.

Keywords: Quality, TQM, Rework, Quality Improvement, Textile sector, Garments Industry

Introduction:

A manufacturing company that possesses many complexities can be highly challenged when maintaining production goals and standards in conjunction with a major organizational change. Garment manufacturing is a complex industry for many reasons. The product line is a complex array of styles, seasons, varying life cycles and multidimensional sizing. Many sewn product firms are viewing TQM as the appropriate strategy to meet the double demand of competition and quality; however, many companies are finding sustaining their TQM adoption decision very difficult. Additionally, TQM’s contribution to a competitive advantage remains unexamined with the context of Management and organizational development research. It can accurately be described as a philosophy about quality that suggest for involving everyone in the organization in a quest for quality. It extends to suppliers as well as to customers.

In fact, in TQM, the customer is the focal point, as the business is driven by customers. As such, customer’s satisfaction is the main driving force. Everyone in the organization, from the top most chief executive, up to the bottom most workers, has to take part in this venture. Achieving world class quality is not just another program; it is an ongoing process. An organization uses TQM as a long term approach to achieving customer satisfaction. Total Quality Management requires all employees of the organization for improving the products, processes and services. TQM focuses on long-term success through identifying and prioritizing customer requirements, setting and aligning goals, and providing deliverables that warrant customer satisfaction (as well as customer delight). However, the main theme of the research is how to improve quality of a garment industry by implementing TQM in practice, which is a real challenge. TQM applications vary widely with product category, organizational settings, management philosophies and practices and so on. This involves three spheres of changes in an organization- people, technology and structure.

Research Objectives:

Main objectives of this study are as follows-

- To find out the basic pillars which are required for implementing TQM in Garments industries.
- To improve productivity and product quality.

- To improve the quality of garment industry of Bangladesh by implementing TQM approach.

Working Methodology:

We divide our working methodology for this study into three major steps-

1. Literature review has been conducted to identify the pillars required to implement TQM in practice. Articles that are related with TQM are reviewed to find out TQM framework.
2. A thorough study has been done to analyze the present condition of product quality. (Defining the Defects Name, Data Collection to find the Frequency of defects, Analysis with TQM tools). Primary data has been collected from various factories according to TQM framework. Collected data has been analyzed. Primary data has been collected through observation method as it was apparent that most of people who work in this industry are not aware about TQM techniques rather they are implementing those as a practice.
3. And finally by implementing Total Quality Management Approach (TQM Approach) in garments industry to analyze the improvement of product quality and productivity.

Defining Quality:

The definition of quality depends on the role of the people defining it. Most consumers have a difficult time defining quality, but they know it when they see it. The difficulty in defining quality exists regardless of product and this is true for both manufacturing and service organizations. Think about how difficult it may be to define quality for services such as airline services, child day-care facilities, college classes, or even OM textbooks. Further complicating the issue is that the meaning of quality has changed over time. Today, there is no single universal definition of quality. Some people view quality as “performance to standards.” Others view it as “meeting the customer’s needs” or “satisfying the customer.” Let’s look at some of the more common definitions of quality.

Conformance to specifications measures how well the product or service meets the targets and tolerances determined by its designers. For example, the dimensions of a machine part may be specified by its design engineers as 3.05 inches. This would mean that the target dimension is 3 inches but the dimensions can vary between 2.95 and 3.05 inches. Similarly, the wait for hotel room service may be specified as 20 minutes, but there may be an acceptable delay of an additional 10 minutes. Also, consider the amount of light delivered by a 60 watt light bulb. If the bulb delivers 50 watts it does not conform to specifications. As these examples illustrate, conformance to specification is directly measurable, though it may not be directly related to the consumer's idea of quality.

Fitness for use focuses on how well the product performs its intended function or use. For example, a Mercedes Benz and a Jeep Cherokee both meet a fitness for use definition if one considers transportation as the intended function. However, if the definition becomes more specific and assumes that the intended use is for transportation on mountain roads and carrying fishing gear, the Jeep Cherokee has a greater fitness for use.

Value for price paid is a definition of quality that consumers often use for product or service usefulness. This is the only definition that combines economics with consumer criteria; it assumes that the definition of quality is price sensitive. For example, suppose that you wish to sign up for a personal finance seminar and discover that the same class is being taught at two different colleges at significantly different tuition rates. If you take the less expensive seminar, you will feel that you have received greater value for the price.

Support services provided are often how the quality of a product or service is judged. Quality does not apply only to the product or service itself; it also applies to the people, processes, and organizational environment associated with it. For example, the quality of a university is judged not only by the quality of staff and course offerings, but also by the efficiency and accuracy of processing paperwork.

Psychological criteria are a subjective definition that focuses on the judgmental evaluation of what constitutes product or service quality. Different factors contribute to the evaluation, such as the atmosphere of the environment or the perceived prestige of the product. For example, a hospital patient may receive average health care, but a very friendly staff may leave the impression of high quality. Similarly, we commonly associate certain products with excellence because of their reputation; Rolex watches and Mercedes-Benz automobiles are examples.

Philosophy of TQM:

Table-1: Philosophy of TQM

Concept	Main idea
Customer focus	Goal is to identify and meet customer needs.
Continuous improvement	A philosophy of never-ending improvement.
Employee empowerment	Employees are expected to seek out, identify, and Correct quality problems.
Use of quality tools	Ongoing employee training in the use of quality tools.
Product design	Products need to be designed to meet customer expectations.
Process management	Quality should be built into the process; sources of quality problems should be identified and corrected.
Managing supplier quality	Quality concepts must extend to a company's suppliers.

Quality Gurus:

To fully understand the TQM movement, we need to look at the philosophies of notable individuals who have shaped the evolution of TQM. Their philosophies and teachings have contributed to our knowledge and understanding of quality today.

Their individual contributions are summarized as following-

Table 2: Quality Guru Vs Their Contribution

Quality Guru	**Main Contribution**
Walter A. Shewhart	–Contributed to understanding of process variability. –Developed concept of statistical control charts.
W. Edwards Deming	–Stressed management's responsibility for quality. –Developed "14 Points" to guide companies in quality improvement.
Joseph M. Juran	–Defined quality as "fitness for use." –Developed concept of cost of quality.
Armand V. Feigenbaum	–Introduced concept of total quality control.
Philip B. Crosby	–Coined phrase "quality is free." –Introduced concept of zero defects.
Kaoru Ishikawa	–Developed cause-and-effect diagrams. –Identified concept of "internal customer.
Genichi Taguchi	–Focused on product design quality. –Developed Taguchi loss function.

The Plan–Do–Study–Act Cycle

The plan–do–study–act (PDSA) cycle describes the activities a company needs to perform in order to incorporate continuous improvement in its operation. This cycle, shown in the following Figure, is also referred to as the Shewhart cycle or the Deming wheel. The circular nature of this cycle shows that continuous improvement is a never-ending process. Let's look at the specific steps in the cycle.

Plan: The first step in the PDSA cycle is to plan. Managers must evaluate the current process and make plans based on any problems they find. They need to analyze all current procedures, collect data, and identify problems. This information should then be studied and used to develop a plan for improvement as well as specific measures to evaluate performance.

Do: The next step in the cycle is implementing the plan (do). During the implementation process managers should document all changes made and collect data for evaluation.

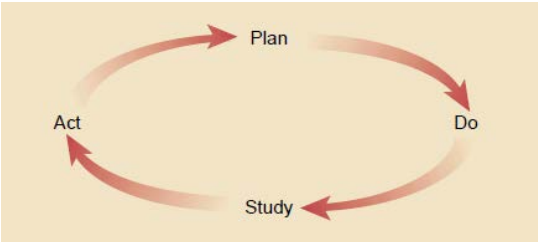

Fig 1: PDSA cycle

Study: The third step is to study the data collected in the previous phase. The data are evaluated to see whether the plan is achieving the goals established in the plan phase.

Act: The last phase of the cycle is to act on the basis of the results of the first three phases. The best way to accomplish this is to communicate the results to other members in the company and then implement the new procedure if it has been successful. Note that this is a cycle; the next step is to plan again. After we have acted, we need to continue evaluating the process, planning, and repeating the cycle again.

Quality Tools:

TQM places a great deal of responsibility on all workers. If employees are to identify and correct quality problems, they need proper training. They need to understand how to assess quality by using a variety of quality control tools, how to interpret findings, and how to correct problems. In this section we look at seven different quality tools. These are often called the seven tools of quality control and are shown in the following figure. They are easy to understand, yet extremely useful in identifying and analyzing quality problems. Sometimes workers use only one tool at a time, but often a combination of tools is most helpful.

Cause-and-Effect Diagrams: Cause-and-effect diagrams are charts that identify potential causes for particular quality problems. They are often called fishbone diagrams because they look like the bones of a fish. The "head" of the fish is the quality problem, such as damaged zippers on a garment or broken valves on a tire. The diagram is drawn so that the "spine" of the fish connects the "head" to the possible cause of the problem. These causes could be related to the machines, workers, measurement, suppliers, materials, and many other aspects of the production process. Each of these possible causes can then have smaller "bones" that address specific issues that relate to each cause. For example, a problem with machines could be due to a need for adjustment, old equipment, or tooling problems. Similarly, a problem with workers could be related to lack of training, poor supervision, or fatigue. Cause-and-effect diagrams are problem-solving tools commonly used by quality control teams. Specific causes of problems can be explored through brainstorming. The development of a cause-and-effect diagram requires the team to think through all the possible causes of poor quality.

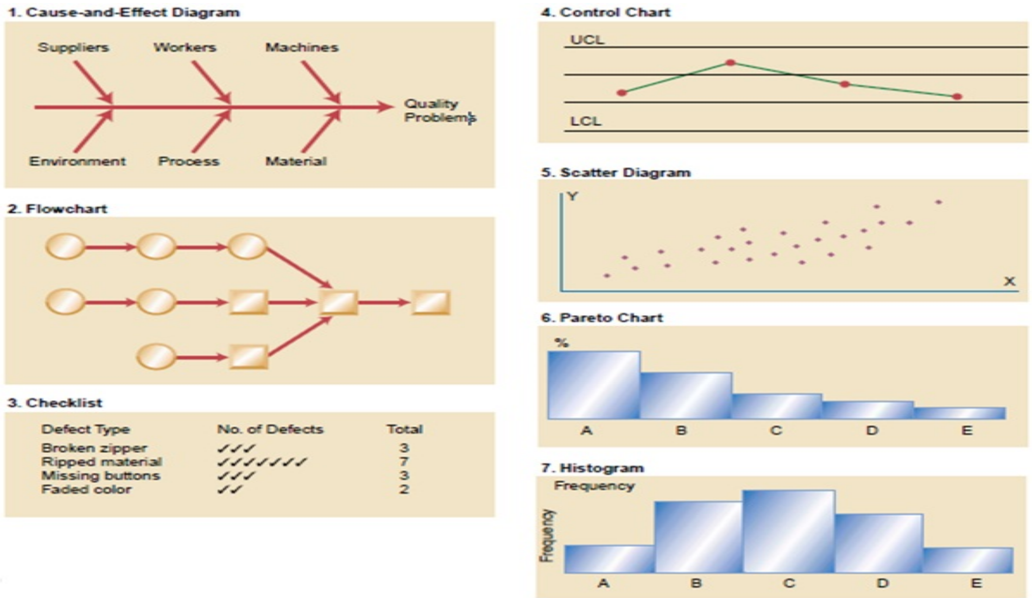

Fig 2: Various Quality Tools

Flowcharts: A flowchart is a schematic diagram of the sequence of steps involved in an operation or process. It provides a visual tool that is easy to use and understand. By seeing the steps involved in an operation or process, everyone develops a clear picture of how the operation works and where problems could arise.

Checklists: A checklist is a list of common defects and the number of observed occurrences of these defects. It is a simple yet effective fact-finding tool that allows the worker to collect specific information regarding the defects observed. For example, if a defect is being observed frequently, a checklist can be developed that measures the number of occurrences per shift, per machine, or per operator. In this fashion we can isolate the location of the particular defect and then focus on correcting the problem.

Control Charts: Control charts are a very important quality control tool. These charts are used to evaluate whether a process is operating within expectations relative to some measured value such as weight, width, or volume. For example, we could measure the weight of a sack of flour, the width of a tire, or the volume of a bottle of soft drink .When the production process is operating within expectations, we say that it is “in control.” To evaluate whether or not a process is in control, we regularly measure the variable of interest and plot it on a control chart. The chart has a line down the center representing the average value of the variable we are measuring. Above and below the center line are two lines, called the upper control limit (UCL) and the lower control limit (LCL). As long as the observed values fall within the upper and lower control limits, the process is in control and there is no problem with quality. When a measured observation falls outside of these limits, there is a problem.

Scatter Diagrams: Scatter diagrams are graphs that show how two variables are related to one another. They are particularly useful in detecting the amount of correlation, or the degree of linear relationship, between two variables. For example, increased production speed and number of defects could be correlated positively; as production speed increases, so does the number of defects. Two variables could also be correlated negatively, so that an increase in one of the variables is associated with a decrease in the other. For example, increased worker training might be associated with a decrease in the number of defects observed. The greater the degree of correlation, the more linear is the observations in the scatter diagram. On the other hand, the more scattered the observations in the diagram, the less correlation exists between the variables. Of course, other types of relationships can also be observed on a scatter diagram, such as an inverted. This may be the case when one is observing the relationship between two variables such as oven temperature and number of defects, since temperatures below and above the ideal could lead to defects.

Pareto Analysis: Pareto analysis is a technique used to identify quality problems based on their degree of importance. The logic behind Pareto analysis is that only a few quality problems are important, whereas many others are not critical. The technique was named after Vilfredo Pareto, a nineteenth-century Italian economist who determined that only a small percentage of people controlled most of the wealth. This concept has often been called the 80–20 rule and has been extended too many areas. In quality management the logic behind Pareto's principle is that most quality problems are a result of only a few causes. The trick is to identify these causes. One way to use Pareto analysis is to develop a chart that ranks the causes of poor quality in decreasing order based on the percentage of defects each has caused. For example, a tally can be made of the number of defects that result from different causes, such as operator error, defective parts, or inaccurate machine calibrations. Percentages of defects can be computed from the tally and placed in a chart. We generally tend to find that a few causes account for most of the defects.

Histograms: A histogram is a chart that shows the frequency distribution of observed values of a variable. We can see from the plot what type of distribution a particular variable displays, such as whether it has a normal distribution and whether the distribution is symmetrical.

Pillars of TQM Implementation:

The definition of TQM may sound simple, but the implementation of it in practice requires an organizational culture and climate. It takes time and patience to complete the process. The process does not occur overnight, the results may not see for a long period of time. Some experts say that it takes up to ten years to fully realize the results of implementing quality management. There are several steps that must be taken in the process of shifting to quality management in an organization.

According to Jablonski- he identified six attributes for successful implementation of TQM program. Those are: Customer focus, Process focus, Prevention verses inspection, Employee empowerment and compensation, Fact-based decision making, Receptiveness to feedback.

Another perception about TQM is: Customer Defined Quality; Top Management Leadership; Primary focus on strategic planning; Employee responsibility at all levels of the organization; Focus on continuous quality improvement to achieve strategic goals; Cooperative efforts between Employees and Management; Utilization of Statistical Process Control (SPC); and Continuous improvement through training and education of the whole workforce.

Another well-known famous writer said in his book some distinguishing characteristics about TQM. Those are: Continual improvement; Customer focus; Organization-wide activity; Employee empowerment; Team approach; Competitive benchmarking; Knowledge of quality control tools; Internal and external customers; and Long term relationship with suppliers. From the literature, we have gathered thorough knowledge about the foundation of TQM. Some authors propose four pillars, while the others propose nine pillars for a successful implementation of TQM. However, adopting the scholars' guidelines in identifying pillars of TQM implementation, we have selected 11 pillars; the brief description of each pillar is given afterwards.

Creation of Quality Management (QM) environment: Quality Management environment is one in which all employees have basic knowledge about quality. They should be safety conscious and use safety devices and follow appropriate tools and techniques. From top management to the worker, should concern with quality first.

Introduction of workers with TQM: Workers must constantly be trained with the tools and techniques that are needed to upgrade the company's quality. Workers must understand the philosophy of quality management (QM) before be user of the tools and techniques.

Use of statistical process control (SPC) tools: To ensure gains in quality, the results must be measured by using of statistical control technique as the company progresses toward its quality objectives. This requires the employees to be trained to use SPC tools and techniques. Without knowledge of using quantitative tools, the organization cannot achieve the intended TQM results.

Generation of starting point: One of the most difficult tasks in the beginning phases of implementing TQM is to determine where to start and when to start. One approach to this beginning is to assume that 80 percent of all the company's problems stem from 20 percent of the company's processes (Pareto's Law). By identifying the problematic processes that fall in this 20 percent category, one can begin to focus on what needs attention first. Focusing attention on these problems first, the organization would have bigger payoffs and could build momentum for the future.

Information sharing in decision taking: If a team approach is to be used and if employees are expected to be involved in the decision-making process, it is imperative that information be shared with everyone. In the strategic decision-making process root level workers' opinions should directly or indirectly be involved.

Encouraging cooperation and teamwork: In many organizations that do not follow TQM philosophy, managers are often on the hunt for someone to blame for problems that are found. This type of environment creates unhealthy stress and discourages innovative thoughts and practices of employees. The combination of a team approach and QM means seeking to improve the system when problems arise.

Customer focus as an element of design: From beginning to end, customer satisfaction should be the focal point of the quality management system. This means that the goal of customer satisfaction must be incorporated in the planning processes and then maintained day in and day out.

Modification of reward systems: Reward systems need to be overhauled periodically to recognize and encourage teamwork and innovation. The team, not the individual, is the foundation for TQM companies. Traditional pay plans are often based on seniority, not on quality and performance. With TQM, pay systems focus on team incentives. If one person in the team doesn't perform at the expected level, the team members will normally handle the situation. Thus, team based reward can motivate the members in achieving the targets.

Selection of right raw materials: Achievement of product quality needs to collect right raw materials at due time. For this, every organization need to build up long term trust-based relationship with supplies and engage combined effort to ensure the quality and availability of raw materials.

Benchmarking: Is the process of comparing one's business processes and performance metrics to industry bests or best practices from other companies. Dimensions typically measured are quality, time and cost. In the process of best practice benchmarking, management identifies the best firms in their industry, or in another industry where similar processes exist, and compares the results and processes of those studied (the "targets") to one's own results and processes. In this way, they learn how well the targets perform and, more importantly, the business processes that explain why these firms are successful.

Building continuous improvement goal: Processes and products should continually be improved. There is no end to the improvement process. This is true for even the best of the best companies. Total quality management never ends.

Cost of Quality:

The reason quality has gained such prominence is that organizations have gained an understanding of the high cost of poor quality. Quality affects all aspects of the organization and has dramatic cost implications. The most obvious consequence occurs when poor quality creates dissatisfied customers and eventually leads to loss of business. However, quality has many other costs, which can be divided into two categories. The first category consists of costs necessary for achieving high quality, which are called quality control costs. These are of two types: prevention costs and appraisal costs. The second category consists of the cost consequences of poor quality, which are called quality failure costs. These include external failure costs and internal failure costs.

Prevention costs are all costs incurred in the process of preventing poor quality from occurring. They include quality planning costs, such as the costs of developing and implementing a quality plan. Also included are the costs of product and process design, from collecting customer information to designing processes that achieve conformance to specifications. Employee training in quality measurement is included as part of this cost, as well as the costs of maintaining records of information and data related to quality.

Appraisal costs are incurred in the process of uncovering defects. They include cost of quality inspections, product testing, and performing audits to make sure that quality standards are being met. Also included in this category are the costs of worker time spent measuring quality and the cost of equipment used for quality appraisal.

Internal failure costs are associated with discovering poor product quality before the product reaches the customer site. One type of internal failure cost is rework, which is the cost of correcting the defective item. Sometimes the item is so defective that it cannot be corrected and must be thrown away. This is called scrap, and its costs include all the material, labor, and machine cost spent in producing the defective product.

Other types of internal failure costs include the cost of machine downtime due to failures in the process and the costs of discounting defective items for salvage value.

External failure costs are associated with quality problems that occur at the customer site. These costs can be particularly damaging because customer faith and loyalty can be difficult to regain. They include everything from customer complaints, product returns, and repairs, to warranty claims, recalls, and even litigation costs resulting from product liability issues. A final component of this cost is lost sales and lost customers.

Sampling Plans and Acceptable Quality Level:

Today, in order to produce which are as little defective as possible, statistical process control methods are being used. Nevertheless, no matter how effective these methods are, it is inevitable that a small amount of defective production will occur. Therefore, enterprises should seek to accomplish the following:

- ❖ to inspect the work done at the end of production;
- ❖ to prevent defective products from reaching other organizations and customers, and
- ❖ to check whether the raw, semi-raw and finished products received from other organizations under particular contracts are in accordance with those contracts.

Thus, to determine whether the product is acceptable, samples taken at various stages are inspected. Sampling for acceptance is a process of taking certain amounts of the production and examining it to see if the mass conforms to predetermine quality specifications, and to evaluate, and accept or reject it accordingly. The inspection process can generally be accomplished through sampling, except for those products which possess vital and functional features. The objective is to describe the main mass with the help of the sample quality.

Sample inspection plans are carried out in four ways:

1. The single-layer sampling plan (SLS),
2. The double-layer sampling plan (DLS),
3. The multiple-layer sampling plan (MLS), and
4. The sequential sampling plan (SS).

Single-layer sampling plan (SLS)

This is a way of taking a decision to accept or reject the party by examining the units taken from the party only once. Here, a random sample of n units is obtained from an N product party. Flawed/flawless inspection is carried out on the samples, and the number of defect goods (d) is determined. For the acceptance of a preset party, the following comparisons are made with the highest number of defective goods (c) that could exist in the sample.

If $d < c$, then the party is accepted.

If $d > c$, then the party is rejected.

For example, a sampling plan that has N = 100, n = 5, c = 2 is a single-layer sampling plan; according to this plan, a sampling with 5 is taken from 100 units and examined. When there are 2 or fewer defective units, then the party is accepted; otherwise it is rejected.

Double-layer sampling plan (DLS)

Distinct from the above, a second chance is given to the party. Attention should be paid during application.

n1: The sampling width which was chosen first from the party with N units.

n2: The sampling width which was chosen second from the party with N units.

c1: The highest number of defects accepted for the first sampling.

c2: The highest number of defects accepted for the second sampling.

d1: The number of defects in the sampling with n1 units.

d2: The number of defects in the sampling with n2 units.

The function of the plan is as follows. Sampling with n1 is taken from the party with N.

- If dl < c1, then the party is accepted.
- If d1 > c2, then the party is rejected.
- If c1 < d1 < c2, a second sample with n2 unit is taken.
- If d1 + d2 < c2, the party is accepted.
- If d1 + d2 > c2, the party is rejected.

Data Collection and Analysis:

The check sheet also called a ‘Defect Concentration Diagram’ is basically a data collection sheet. By using check sheet we have collect the frequency of defect. The entire defect is not occurred in same frequency, some defect is appearing very frequently and some is in less frequent. For analyzing purpose we have collected Defect Name and Defect Qty from garments section of a renowned garments industry that is Ananta Apparels Ltd, Bangladesh.

Table 3: Defects Vs no. of Defects found

Defect Name	Defect Qty.
Oil Spot	1423
Dirty Spot	1156
Skip stitch	1478
Open seam	989
Uncut thread	415
Uneven stitch	564
Broken stitch	324
Button attach	757
Raw edge	654
Dyeing spot	456
Label missing	864
Puckering	156
Fabric hole	121

Methods of Quality Control:

Piece goods quality control: On receipt of fabrics in the ware house, at least 10% are inspection as per "4 Points" system/10 Points system/2.5 Point system/6.0 Point system. The most commonly used 4 Points system as per below –

Penalty points for various defects-

- 3 Inches or less is equal to 1 Point
- Over 3, under 6 Inches is equal to 2 Point
- Over 6, under 9 Inches is equal to 3 Point
- Over 9 Inches is equal to 4 Point

A maximum of 4 points are changed in one linear yard.

Quality control in Cutting section: In cutting section quality is ensured in two stages.

a) Spreading quality control: Following the point are checked during spreading

- Table marking.
- Ends positioning
- Tension
- Narrow Goods
- Ply height
- Remnants
- Marker placing

b) After cutting quality control: After each cutting blocks and bundles are checks on the following points.

- Miss cut
- Ragged cutting
- Pattern checks
- Matching Plies
- Notches

In process quality control (Sewing): During the swing "In process quality control" is done by the line QC's through 7 pcs inspection system. For critical operations 100% process inspection are carried out. The following parameters are also checked in sewing process –

a) Machine check.
b) Tension.
c) SPI checks
d) Needle check.
e) Cleanness.
d) Table inspection.
f) Inspection before wash.

Quality control in washing section

a) Garments handling
b) Wash standard.
c) After wash thoroughly inspection.

Quality control in finishing sections: Following inspection/audit is done to attain AQL (1.5/2.5/4.0 etc).

a) Process inspection: Garments are checked process wise in the finishing section to identify defects and pass only the passed garments.
b) Two hourly audit: Every after two-hours audit is done on finishing lot to attain AQL the required AQL.
c) Days final audit: At the end of the day accumulated lot of finished garments are statistically audited to attain required AQL.
d) Lot final audit: On completion of packing of one complete lot of garment, QA manager conduct statistical audit based on required AQL garments. Garments are offered for final inspection by buyer /clients for shipment only when these are through in this audit.

The following parameters are also checked in sewing process –

a) After wash garments must be keep in the box /table covering.
b) Thread sucking.
c) Iron inspection.
d) Measurements inspection.
e) Poly inspection of top of garments.
f) Inspection before cartooning.

Results:

Result Analysis after TQM implementation on Ananta Apparels Ltd, Bangladesh.

Table-4: TQM implementation results

Area	Before Implementation	After Implementation	Improvement
Defect %	8.92	6.20	30%
Repair/Rework %	7.36	2.25	69%
Reject/Scrap %	1.12	0.93	17%
Quality %	87.25	93.45	7%
Efficiency %	51	59	16%
Team Approach	Not Strong	Stronger than previous.	Improved
Reward System	No	Yes	Improved
TQM Knowledge of workers	No	Yes	Improved

Why TQM Efforts Fail:

From the above discussion we found that we can get so many benefits through implementing TQM in our workplace. Yet there are still many companies that attempt a variety of quality improvement efforts and find that they have not achieved any or most of the expected outcomes. The most important factor in the success or failure of TQM efforts is the genuineness of the organization's commitment. Often companies look at TQM as another business change that must be implemented due to market pressure without really changing the values of their organization. Recall that TQM is a complete philosophy that has to be embraced with true belief, not mere lip service. Looking at TQM as a short-term financial investment is a sure recipe for failure. Another mistake is the view that the responsibility for quality and elimination of waste lies with employees other than top management. It is a "let the workers do it" mentality. A third common mistake is over- or under-reliance on statistical process control (SPC) methods. SPC is not a substitute for continuous improvement, teamwork, and a change in the organization's belief system. However, SPC is a necessary tool for identifying quality problems. Some common causes for TQM failure are

- Lack of a genuine quality culture
- Lack of top management support and commitment
- Over- and under-reliance on statistical process control (SPC) methods

Companies that have attained the benefits of TQM have created a quality culture. These companies have developed processes for identifying customer-defined quality. In addition, they have a systematic method for listening to their customers, collecting and analyzing data pertaining to customer problems, and making changes based on customer feedback. You can see that in these companies there is a systematic process for prioritizing the customer needs that encompass the entire organization.

Recommendations:

- Training to understand TQM and enhance commitment throughout the organization.
- Building efficient supply chain Management with collaborations of supplier and other market intermediaries.
- Establish efficient communication chain for flow of information with the help of information technology
- Provide proper motivation to the supplier and customer

Conclusion:

TQM has no specific destination and its changing limit is also endless. Organizations always try to improve as well as different techniques and tools are invented parallel customer expectation are enhanced. So definition of quality is always evolving. With the intensifying competition, and putting the concept of 'total quality' into practice, it appears that firms which function according to the concept of 'acceptable quality level' (AQL) have no other choice but to adopt a 'zero defect' (ZD) policy. The perception of AQL is replaced by the perception of '100% quality' or zero defect. In the past, customers would accept goods with 1%, 2%, or even 5% defects; today they satisfy their needs with companies whose production error levels are measured in ppm (parts per million), ppb (parts per billion) or ultimately ZD. To guarantee 100% quality through examination is impossible.

In present world where competition is at the highest level, enterprises that can produce accumulated technological knowledge and can make their production flexible while considering the market variability, gain very high competitive power by providing their customers with products of higher quality, which are appropriate to standards, and are available at lower prices. Thus, enterprises should do the following to increase their competitive power: establish closer relations with their customers, meet their expectations of production quantity and time, assess complaints, observations and satisfactions separately, ensure continuity in their development by comparing their products with others', and direct upcoming work on the basis of the market information which they have analyzed.

References:

Md. Mazedul Islam & Adnan Maroof Khan. (2013), "Application of Lean Manufacturing to Higher Productivity in the Apparel Industry in Bangladesh", *International Journal of Scientific & Engineering Research*, Volume 4, Issue 2, pp. 1-10

WikiAnswers.com;what is tqm? Retrieved from http://WikiAnswers - What is tqm.htm; September 06, 2009.

Haskin & Ahsan Akhtar, (2007), Quality Control and Management; *Bangladesh Business Solutions*, Dhaka, Bangladesh.

Kolarik, J. William, (1995), Creating Quality-Concepts, Systems, Strategies, and Tools, *International Editions*, McGraw-Hill, New Delhi, India.

Md. Mazedul Islam, Adnan Maroof Khan & Md. Mashiur Rahman Khan, (2013), "Minimization of Defects in the Sewing Section of Apparel Industry" *Research Journal of Management Sciences*. Vol. 2(8), pp. 10-15

Important Principles of Total Quality Management Retrieved from http://managementhelp.org/quality/total-qualitymanagement.htm .

Pradip V. Mehta ,(1985) An introduction to quality control for the apparel industry, J.S.N. *International Schottmiller*, P.1997, What's so unique about sewn products. Bobbin. pp 23.

PK Balaji, (2012) Quality Control in Apparel production, *Research Journal of Management Sciences*, ISCA, 2(2), pp.57-69

Total Quality, 1992, KOGAN PAGE LIMITED, London.

Jablonski, (2010), making TQM work; web:http://www.referenceforbusiness.com/encyclopedia/Thir/TotalQualityManagementTQM.html, 03 jan, 2010.

Powell, T.C., (1995), "Total quality management as competitive advantage: A review and empirical study".

Mahajan M., (2002) *Statistical Quality Control*, Dhanpat Rai and Co. (P) LTD**.** 186-206 (2002)