

Application of Total Quality Management principles in a power plant

By

Md. Arif Reza Khan

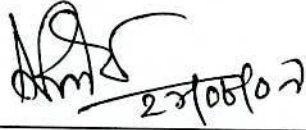


A Project submitted in partial fulfillment of the requirements for the degree of Master of Science in Engineering in Industrial Engineering and Management.

Khulna University of Engineering & Technology  
Khulna 9203, Bangladesh.


## Declaration

This is to certify that the project work entitled 'Application of Total Quality Management principles in a power plant' has been carried out by Md. Arif Reza Khan in the Department of Industrial Engineering and Management, Khulna University of Engineering & Technology, Khulna, Bangladesh. The above research work or any part of the work has not been submitted anywhere for the award of any degree or diploma.



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Professor Dr. Md. Kutub Uddin  
Head  
Department of Industrial Engineering and Management

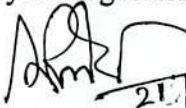


Handwritten signature of Md. Arif Reza Khan, dated 21.08.09.

Md. Arif Reza Khan  
Roll No. 0411505

## Approval

This to certify that the project work submitted by Md. Arif Reza Khan entitled 'Application of Total Quality Management Principles in a Power Plant' has been approved by the Board of Examiners for the partial fulfillment of the requirements for the degree of Master of Science in Engineering in the Department of Industrial Engineering & Management, Khulna University of Engineering & Technology, Khulna, Bangladesh in August 2009

-   
21/08/09  
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1. \_\_\_\_\_  
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Head ( )  
Department of Industrial Engineering & Management  
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Rajshahi University of Engineering & Technology

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The Author



## ABSTRACT

Bangladesh Power Development Board (BPDB) is the most important and largest organization of Bangladesh in power sector. Once, total electricity generation, transmission and distribution was under control of BPDB. But presently, BPDB generates only 65.04% of the total electrical energy. The rest is generated by Private sector IPP (Independent Power Plant). BPDB distributes 25.47 % of the total energy in the consumer's premises whereas other companies distribute the rest 74.53%. In the present time, the largest organization could not run effectively with the fulfillment of consumer's demand and proper service (**APPENDIX-A&B**). As a result, DESA, DESCO, WZPDCL etc. were separated from BPDB. REB captures a large portion of the distribution areas of BPDB for the reason of corruption, loss and overall mismanagement.

Now, 34.96% of total energy are generated by Independent Power Plants (IPP). Independent Power Plants (IPP) started their mission from 1998 and are continuously increasing their strength in power sector. If such situation continues, once IPP will control our power sector. It is common thought that they will also control the economy of the country. Presently negotiating with IPP, Bangladesh Government fixes the purchasing rate of electricity from IPP. If BPDB fails and IPP becomes stronger, they may form a syndicate in power sector and can fix electricity rate according to their wish. This will cause a bad impact on our economy. This does not mean to avoid IPP. Power stations of BPDB should increase with it's own strength and compete with IPP by fair-means because consumers always get the highest benefits from the competitive market. So for a safe competitive market, existence of power stations of BPDB is too much essential as a soldier of power sector of the country. It is sure that an organization needs proper management activity and vision to stabilize it's own strength. Bangladesh Power Development Board (BPDB) has taken some managerial changes and reforms to increase its managerial strength in the light of TQM. But some problems have arisen that may terminate the TQM activities. So, it is essential to find out these problems and take some measures to solve these barriers considering the national interest. Keeping this view in mind, data for this project were collected from Khulna Power Station as primary data through a prescribed questionnaire.

Two sets of questionnaires were prepared; one for workers another one for managers. One power station named Khulna Power Station (KPS) was taken into consideration for data collection. During study, different categories of KPS's workers and managers were interviewed based on the level of technical knowledge, experience, intimacy with Total Quality Management program and also educational level. The sample was kept relevant considering the time and cost. Experienced workers and managers were included in the sample. The sample size was limited to 120 for workers and 20 for Managers. The different categories of workers were regrouped into four categories for the study purpose, such as High- skilled, Skilled, Semi- skilled and Un -skilled. 25% High-Skilled, 33% Skilled, 25% Semi-Skilled and 17% Un-Skilled workers were selected as sample to reflect the staffing pattern of Bangladesh Power Development Board (**Appendix-C**). Lack of commitment of higher authority, Insufficient knowledge of workers on TQM, Weak monitoring system, Negligence of field level workers, Lack of guidelines of TQM implementation, Adverse culture were also identified unanimously by workers as causes of failure of TQM in power stations of BPDB. Most of the managers were agree with the causes mentioned by workers. For successful implementation of TQM 30.76% managers suggested to ensure proper monitoring from TQM promotion office, followed by 21.15% suggested for continuous monitoring from higher authority, 17.3% for raising awareness, 13.46% for proper training, 9.61% for provision of reward or punishment. As far as knowledge of rules and regulations is concerned about 12.5% workers know about present service rules. But most of them do not have any idea about service rules.

At last, some recommendations are made for successful implementation of TQM in power stations under BPDB. The proper application of the recommendations will be helpful to improve the present situation of Total Quality Management in power stations under BPDB and there by will be possible a sound operation of Bangladesh Power Development Board as per Total Quality Management.

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## List of Abbreviations

TQM: Total Quality Management  
QC circle: Quality Control circle  
WAPDA: Water and Power Development Authority  
BPDB: Bangladesh Power Development Board  
REB: Rural Electrification Board  
DESCO: Dhaka Electric Supply Company  
DESA: Dhaka Electric Supply Authority  
KPS: Khulna Power Station  
MMD: Mechanical Maintenance Division  
EMD: Electrical Maintenance Division  
I & C: Instrument & Control  
WZPDCL: West Zone Power Distribution Comapy  
MW: Mega Watt  
MR: Meter Reader  
SBA: SwitchBoard Authority  
AE: Assistant Engineer  
SAE:Sub Assistant Engineer  
XEN: Executive Engineer  
SDE: Sub Divisional Engineer  
ADB: Asian Development Bank  
ACR: Annual Confidential Report  
CBA: Collective Bargaining Agent  
EGCB: Electricity Generation Company Bangladesh  
GWh: Gega-watt hour  
GPF: General Provident Fund  
ISO: International Standard organization  
IPP: Independent Power Plant  
KPCL: Khulna Power Company Limited

## Glossary

**TQM:** Total Quality Management is a management tool. In this management all levels of employees of an organization are involved in decision making. Employees are empowered and decisions are taken from bottom level rather than top level.

**Quality:** Quality is defined as the fitness for use.

**Quality Control circle:** Quality Control circle is the field level unit of problem identifications and decision making in TQM system. Normally each quality control circle contains 4-10 members.

**Facilitator:** Facilitator provides logistic support to the QC circle members. Normally, employee of supervisory level works as facilitator.

**Steering committee:** Steering committee provides proper guidelines and directions to the QC circles.

**Culture:** An organization culture is the everyday manifestation of it's underlying values and traditions. It shows up in how employees behave on the job, their expectations of the organization and each other, and what is considered normal in terms of hoe employees approach their jobs.

**Commitment:** Commitment can be defined, as the individual's certain feelings related to organization that must be carried out.

**Problem:** Problems are that types of incidents that happened frequently.

**5W:** It is a tool, which provides guidelines to solve a problem. It comprises of five initial letter of five words as what, where, when, who and why.

**Innovation:** Innovation is the continual improvement of existing product or service in a new direction.

**7 tools of TQM:** These tools are used to identify the root cause of problem. The tools are- Check sheet, Pareto chart, Cause-effect diagram, Histogram, Graph and control chart, Scatter diagram and Stratification diagram.

## CHAPTER 01

### INTRODUCTION

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#### 1.1 General

Electricity is an essential ingredient to the socio-economic development. Reliable and adequate power supply is a pre-requisite for the development of the country. To achieve GDP growth target, it is essential to maintain the electricity growth at 1.5 to 2.0 times of the GDP growth. After the liberation, the former policy maker of Bangladesh Government realized that to turn the economy into superior position, it was necessary to make energy especially electricity, available to the door of every citizen. In those days, a single organization named Water and Power Development Authority (WAPDA) was existing for the development of power and water sector of the country. It's electrification activities were town oriented with a slow motion. The policy makers thought that the way to develop the country rapidly was the quicker electrification through out the country. But rapid electrification was really impossible by existing WAPDA. Then the policy makers concentrated their focus to establish an individual organization that will concentrate its activities only in power sector. Bangladesh Power Development Board (BPDB) was created in May 1, 1972 by Presidential Order No. 59 after bifurcation of erstwhile Bangladesh Water and Power Development Authority. The BPDB was the only organization responsible for generation, transmission and distribution of electricity through out the country.

From very beginning of formation of Bangladesh Power Development Board (BPDB), most of the consumers did not have any energy meter. Then electricity was generated and supplied to the consumers without any accountability. Due to not having any accountability, the consumers used electricity according to their wish with the help of corrupted distribution system workers. Rules and regulations were fully absent in this sector. The motion of electrification was also slower. The aim of establishment BPDB was fall in vain within a very short period.



The major impediments of the power sector development are electricity theft, corruption and poor management.

The government is under serious pressure to reform the power sector as per consumer's demand by the donor agencies like ADB, World Bank etc. The government is committed to develop the power sector and has already taken a number of measures in order to improve the sector. The existence of BPDB is under serious threat. It has been separated in a number of organizations named DESA, DESCO, WZPDCL and NWPZCL etc. The expectation of consumers to get better service is growing day by day and to keep pace with the consumer's expectation, the reformation of BPDB is continuing.

The Board is now under the Power Division of the Ministry of Power, Energy and Mineral Resources. BPDB's present vision is to provide quality and reliable electricity to the people of Bangladesh for desired economic, social and human development of the country undertaking institutional and structural reforms leading to the creation of a holding company.

Top management of BPDB decided to implement Total Quality Management (TQM) for the improvement of present situation in different offices under Bangladesh Power Development Board (BPDB). A directorate named TQM promotion office has been established in 2002 and TQM is already implemented in 190 offices in BPDB [1]. From 2002 to 2007 is a long period but achievement of TQM implementation is not up-to the mark. If motion of implementation TQM remains in such state, it will not be easy to save BPDB from the present difficult situation. Motion of implementation of TQM process must be quicker and this requires a change in present managerial environment and culture. Like other part of BPDB, TQM program has been taken in power stations of BPDB. But the program did not come to success. The obstacles present in power stations of BPDB to implement TQM have been found out through the study. So, to identify the problems of TQM implementation in power stations, Khulna power station has been taken as sample. Before entering into the detail discussion in the next chapter, a brief discussion on KPS, existing problems in power stations of PDB, history of TQM and its application in power stations of PBD is highlighted below.

## **1.2 Exiting Problems of power stations of BPDB**

Like other government organizations, various type of problems exist here. Due to bad influence of CBA and lack of inter coordination among different departments, the normal operation is hampered frequently which create bad impact on our economy. Thousands of problems exist here related to both technical and managerial. Improper repair and maintenance of power plants, mismanagement in stores, mismanagement in procurement policy, lack of HRD program, uncontrolled CBA, unruly workers etc are mention-able among the existing problems. A brief discussion of the major problems is given below.

### **Lack of management commitment**

Commitment can be defined, as the individual's certain feelings related to organization that must be carried out. Power stations of Bangladesh Power Development board are government organization, here planning of any activity starts from high level of authority. In most cases, actual data are not collected from the root level. Asian Development Bank, World Bank or any other donor agencies dominate money as the stakeholder & also provide guidelines how to use it. So, commitment does not coincide with the general people's requirements. Again, most of the time, top management takes plan and implement, as their own thinking they don't monitor it through continuous supervision. As a result, many projects do not come to success effectively after completion and a loss is then the result of action. What authority or management wants to do is not understandable and the management view do not intersects with the demand of general people. Due to lack of management commitment workers of power stations under Bangladesh Power Development board are of highly mismanaged. Here, absenteeism is too high, high rate of work stoppage or breakage, high rate of grievances, and finally lack of productivity or efficiency.

### **Defective procurement plan**

At the beginning of every fiscal year, each department of power stations of Bangladesh Power Development Board prepares annul procurement plan for purchasing materials. In case of emergency repair & unavailability of required materials due to lack of storage & lead-time local authority carries out local purchase. Local authority through RFQ (Request for Quotation), RTM (Restricted Tendering Method), DPM (Direct Procurement Method) &

OTM (Open Tendering Method). In case of foreign purchase, list of required materials are prepared by local authority and then it is sent to Purchase Directorate. Drawbacks of existing procurement policy:

1. At the time of preparation APP (Annual Procurement Plan) lead time is not considered, So, in case of emergency repair, sometimes materials are not available and thereby undesired interruption of plants.
2. Materials lists are not prepared as planned way. Some material that is purchased frequently creates storage problem where as some are of very irregular duration as a result crisis of a specific event occurs sometimes.
3. Lacks of co-ordination between inter departments during purchasing.

#### **Problems related to collective bargaining agent (CBA)**

Collective Bargaining is the process used to make agreements between management and labor unions. Collective Bargaining Agent is the respondent of general worker elected or nominated by workers. They act as the bridge of communication between workers and management. They place the demands of workers to the management and try to solve them as per labor laws, rules & regulation of organization and also the constitution of the state. In power stations of BPDB, CBA was established in 1972. Collective Bargaining Agents (CBA) are normally elected from direct vote of general workers. Obviously, the workers expect that CBA will bargain with management, to preserve their rights. The rights may either legal or illegal, a huge number of workers meet with CBA daily & keep them busy. To be elected, they need worker's vote & keeping this in mind, CBA try to satisfy most of the workers. All most everyday CBA faces management & involved in bargaining with management to solve various problems related to workers. When management fail to attend an illegal issue, CBA go against management & sometimes they become so ferocious that the situation is indescribable. Sometimes CBA receive illegal benefits from workers to solve their problem. CBA try to solve the problem either pursuing the management or by creating pressure. In case of failure, they misguide the general workers and insist the workers to attack management sometimes. When adverse situation arises between CBA & management

in favor of any issue, political leader protect workers leader and give them shelter. As a result, management doesn't take legal action against the sinful workers & their leaders. Day by day the situation has gone to worse position in our country & a picture of CBA was observed by the citizen while a program against corruption has been carried out by the Care Taker Government recently. Now a days management does not handle CBA but CBA handle management.

### **Problems of excessive employees**

Every department has too many employees than required. During study, the legal authority of each department informed that total numbers of employees are not required at a time in repair or maintenance works. Most of the workers don't have any work and they pass their time by gossiping in respective section most of the time. During working hours (8 am to 4 pm) normally they don't perform any activity. After end of the working hours, sometimes they engage in works & claim extra benefit as over time for such works. For mismanagement & over setup, the per unit operating cost is high in power stations of BPDB.

### **1.3 History of TQM and its application in power stations of BPDB**

The concepts of quality control as a distinct discipline emerged in the United States in 1920s. At that time, quality control was intended to simply control, limit the escape of defective items in the industrial Processes. As the quality control concept emerged in the first half of the 20<sup>th</sup> century, numerous refinements occurred. Quality management continued to develop under Deming's guidance, whom many regard as the father of modern quality philosophers. Deming's management philosophies were first developed in the years prior to 2nd world war. After 2nd world war, Deming was invited to Japan to serve as a management consultant for the Japanese industries as they rebuilt their industrial base. Japan, then as now, was an island nation that had to import all of it's raw materials. The Japanese were attentive listeners when Deming advised them. Japanese saw Deming's approach of way to prevent waste and maximizing their productivity. Deming praised the virtues of using statistical quality control and manufacturing method to reduce waste. The Japanese were willing to learn Deming's teaching. After the application of quality management, the Japanese dominated every market they choose to enter: such as electronics,

automobiles, steels, shipbuilding, motor cycles, machine tools and many other products. Superior quality became the common theme for Japanese market dominance. The Japanese automobile, especially when compared to a car produced in U.S.A was simply incredible. Even though the gas crunch went away, it was too late. American drivers experienced high quality Japanese automobiles. Major industries in America began to focus on quality serious manner. Other industries simply disappeared from American landscape succumbing to their Japanese competition. United States recognized that other management philosophies should be applied to the quality improvement challenge. This blending of additional management philosophies, all targeting quality improvement, becomes known as the Total Quality Control concept. The concept developed under the concept guidance and techniques of Feigenbaum, Deming, Juran and others. Total Quality Control (TQC) become Total Quality Management philosophy and that concept continued to emerge as predominant management philosophy in the United States and abroad during 1980s and the 1990s. TQM (Total Quality Management) emphasizes a number of concepts all of which support philosophies of customer focus, continuous improvement, defect prevention and recognition that quality responsibility belongs to each of company's departments.

Total Quality Management (TQM) is a culture and effective tool for management improvement. Many countries of the world developed their management culture through implementation of TQM. BPDB including power stations has already started TQM in its different offices. A directorate named TQM promotion office has been created in August 2002 to look after TQM activities in BPDB. TQM is under implementation in 190 offices in BPDB. 639 numbers. of Quality Control (QC) circle are working actively in 190 offices under the guidance of TQM promotion office. 157 numbers. of steering committees are working to monitor the activities of TQM in 190 offices. Zonal competition held regularly in 6 zones from August'05 to February'06. Internal QC circle convention of BPDB held regularly. Monthly meeting of TQM task team held in every month to monitor the TQM activities in selected offices. TQM training has been imparted to 4453 numbers. officers & Staffs till FY 2008. JICA is supporting through technical assistance to promote TQM in BPDB [1].

#### **1.4 Background of the research**

Once, Bangladesh Power Development Board (BPDB) was the most important and largest organization of Bangladesh public sector. Total electricity generation, transmission and distribution was under control of BPDB. But presently, BPDB generates only 65.04% of the total energy generation (**APPENDIX-D**). The rest is generated by Private sector IPP (Independent Power Plant). BPDB distributes 25.47 % of the total energy in the consumer's premises whereas other companies distribute the rest 74.53%. In the present time, the largest organization could not run effectively with the fulfillment of consumer's demand and proper service. As a result, DESA, DESCO, WZPDCL etc. were separated from BPDB. REB captures a large portion of the distribution areas of BPDB for the reason of corruption, loss and overall mismanagement.

Now, 34.96% of total energy are generated by Independent Power Plants (IPP). Independent Power Plants (IPP) started their mission from 1998 and are continuously increasing their strength in power sector. If such situation continues, once IPP will control our power sector. It is common thought that they will also control the economy of the country. Presently negotiating with IPP, Bangladesh Government fixes the purchasing rate of electricity from IPP. If BPDB fails and IPP becomes stronger, they may form a syndicate in power sector and can fix electricity rate according to their wish. This will cause a bad impact on our economy. This does not mean to avoid IPP. power plants under BPDB should increase with it's own strength and compete with IPP by fair-means because consumers always get the highest benefits from the competitive market. So, for a safe competitive market, existence of government power plants under BPDB is too much essential as a soldier of power sector of the country. It is sure that an organization needs proper management activity and vision to stabilize it's own strength. Bangladesh Power Development Board (BPDB) has taken some managerial changes and reforms in power stations to increase its managerial strength in the light of TQM. But some problems have arisen that may terminate the TQM activities in power stations. So, it is essential to find out these problems and take some measures to solve these barriers considering the national interest.

### **1.5 Objectives**

Power stations under BPDB have started training on TQM, seminar and other policies to implement TQM. But some problems exist which are the barriers to implement TQM. These problems are very much severe to implement TQM in these organizations. The objects of this research work are:

- (1) Identifying existing problems both managerial and technical in power stations to implement TQM through field visit.
- (2) Arranging the problems according to their importance.
- (3) Identify the root cause of each problem.
- (4) Provide necessary recommendations to overcome these problems for TQM implementation and for sound operation of power stations under BPDB as a whole.

### **1.6 Scope of the study**

Data has been collected from Khulna Power Station (KPS) during study. Different categories of workers (Foreman C and D, switchboard authority-A, B and C, electrician-A, B and C) and managers were interviewed based on the level of technical knowledge, experience, and also education level. The respondents as interviewee were limited to 120 numbers for employees and 20 Managers.



CONCEPT OF TOTAL QUALITY MANAGEMENT

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**2.1 Introduction**

Total Quality Management is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival of world class competition. Only by changing the actions of the culture, entire management can be transformed. TQM is most part common sense. Analyzing the three words-

Total-Made up of the whole.

Quality-Degree of excellence a product or service provides.

Management-Act, art or manner of handling, controlling, directing etc.

Therefore TQM is the art of managing the whole to achieve excellence. TQM is defined as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. It is the application of quantitative method and human resources to improve all the processes within an organization and exceed customer needs now and in the future. TQM integrates fundamental techniques, existing improvement efforts and technical tools under a disciplined approach.

Actually TQM is a advanced management tools where employees are involved and empowered in decision making. In traditional management, decisions are taken by top management and are imposed to the next level managers and workers. But in TQM, field level workers identify problems and also provide suggestion to solve them. TQM focus is always to satisfy customers through continuous quality improvement of existing products or services.

The purpose of TQM is to provide a quality product and/or service to customers which will, in turn, increase productivity and lower cost. With a higher quality product and lower price, competitive position in the marketplace will be enhanced. This series of events will allow the organization to achieve the objectives of profit and growth with greater ease. In addition the workforce will have job security, which will create a satisfying place to work.



## **2.2 Historical Review**

The history of quality control is undoubtedly as old as industry itself. During the middle Ages, quality was to a large extent controlled by the long period of training required by the guilds. This training instilled pride in workers for quality of a product. The concept of specialization of labor was introduced during the Industrial revolution. As a result, a worker no longer made the entire product, only a portion. This change brought about a decline in workmanship. Because most products manufactured during that early period were not complicated, quality was not greatly affected. In fact, because productivity improved there was a decrease in cost, which resulted in lower customer expectation. As products became more complicated and jobs more specialized, it became necessary to inspect products after manufacture.

In 1942, W.A Shewart of Bell Telephone Laboratories developed a statistical chart for the control of product variables. This chart is considered to be the beginning of statistical quality control. Later in the same decade, H.F Dodge and H.G Roming, both of Bell Telephone Laboratories, developed the area of acceptance sampling as a substitute for 100% inspection. Recognition of the value of statistical quality control became apparent by 1942. Unfortunately, U.S managers failed to recognize its value.

In 1946, the American Society for Quality Control was formed. Recently, the name was changed to American Society for Quality. This organization through its publications, conferences, and training sessions, has promoted the use of quality for all types of production and service.

In 1950, W Edwards Deming, who learned statistical quality control from Shewart, gave a series of lectures on statistical methods to Japanese engineers and on quality responsibility to the CEOs of the largest organizations in Japan. Joseph M. Juran made his first trip to Japan in 1954 and further emphasized management's responsibility to achieve quality. Using these concepts, the Japanese set the quality standards for the rest of the world to follow.

In 1960, the first quality control circles were formed for the purpose of quality improvement. Simple statistical techniques were learned and applied by Japanese workers.

By the late 1970s and early 1980s, U.S. managers were making frequent trips to Japan to learn about the miracle. These trips were really not necessary, they could have read the writings of Deming and Juran. Nevertheless, a quality renaissance began to occur in U.S. products and services, and by the middle of 1980 the concepts of TQM were being publicized.

### **2.3 Continuous Improvement**

Continuous improvement is a management philosophy that approaches the challenge of product and process improvement as a never-ending process of achieving small wins. It is an integral part of a total quality management system. Specifically, continuous improvement seeks continual improvement of machinery, materials, labor utilization, and production methods through application of suggestions and ideas of team members.

The most commonly used technique to do continuous improvement is through use of the Plan-Do-Check-Act Cycle, initially developed by Walter Shewhart of Bell Labs in the 1930's. This cycle, also called "The Shewhart Cycle", says that you continually go through the cycle with a process, each iteration of which improves the process slightly. First, you plan the process or change, then you do it. i.e., the process or change. After the process or change is completed, next you check your results, usually by taking measurements. Then, based on the results of the measurements, you act. That is, you continue with the process or change you developed or re-enter the cycle and improve on the initial change by going through the cycle again.

### **2.4 Benefits of TQM**

TQM is a good investment as shown by a ten-year study by Hendricks and Singhai. They showed that there is a strong link between TQM and financial performance. The searchers selected a group of 600 publicly traded organizations that had won awards for effectively implementing of TQM. They then selected a control group similar in size and industry to the award winners. Performance of both groups was compared during the five years prior to the award and five years after winning the award. No difference was shown between the two groups prior to the award. However as shown below the award group far outstripped the control group during the five-year period after the award.

Description	control	Award
Grown in the Operating Income	43%	91%
Increase in Sales	32%	69%
Increase in Total Assets	37%	79%

The study also showed that stock price performance for the award winners was 114% while the Stock price performance was 80% for the control organization. In addition the study showed that small organizations out performed larger organizations. Recent studies have shown that only about 30% of manufacturing organizations have successfully implemented TQM.

### **2.5 Process of TQM implementation**

The TQM implementation process begins with senior management and, most important, the CEO's commitment. The importance of the senior management role cannot be overstated. Leadership is essential during every phase of the implementation process and particularly at the start. Senior management needs to be educated in the TQM concepts. In addition to formal education, managers should visit successful TQM organizations, read selected articles and books and attend seminars and conferences. The next step is the formation of the quality council. Initiation of these duties is a substantial part of the implementation of TQM. The development of core values, a vision statement, a mission statement, and a quality policy statement, with input from all personnel, should be completed first.

The active involvement of middle managers and first line supervisors is essential to the success of the TQM effort. They are accountable for achieving many of the organization's performance goals and objectives and they form enduring links in the communication chain from senior management to the front line workers. Without middle management's early and active support, the TQM effort could fail. Senior management needs to ensure that managers at all level have an opportunity, as soon as possible, to develop ownership in the TQM effort and a chance to acquire the insight and skills necessary to become leaders. One way to accomplish this concept is to have a retreat. The retreat will focus TQM training, leadership skills, and active involvement in the development of the organization's statements.



At this stage of implementation process, it is important to communicate TQM to the entire organization. Communication is important throughout the implementation stage. Communication is necessary to create TQM awareness, interest, desire, and action.

Everyone needs to be trained in quality awareness and problem solving. This training is conducted when the employee is placed on a project team or the work group is ready for the training.

### **2.6 Problems identification technique in TQM**

Quality Control circles formed with field workers (QC) are the primary levels of problem identification in TQM. Each Quality Control circle (QC) contains 4-10 members. The members of Quality Control circle will discuss among them to find out the existing problems in their working place. At least, one meeting per week must be held. The meeting may be held either in working place, outside the working place or even in a restaurant. An officer of equivalent sub assistant engineer (SAE) or assistant engineer (AE) termed, as facilitator of QC circle will provide necessary support for arranging meeting. The problems find out in the meeting of QC circle will be summarized according to their importance. The members of QC circle also solve the problems discussing among them. The problems for, which need help of higher authority to solve, will be thrown to top management through proper channel.

### **2.7 Tools used in TQM to identify problems**

There are many tools to use for problem finding in Total Quality Management. Examples of some commonly utilized tools in TQM are given below.

- Pareto Chart
- Histogram
- Scatter Diagram
- Fishbone Diagram
- Check Sheet
- Benchmarking
- Flow Chart
- Control Chart

## CHAPTER 03

### LITERATURE REVIEW

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#### 3.1 General

Bangladesh Power Development Board is the most important and largest organization of Bangladesh in public sector. BPDB distributes 25.47 % of the total energy in the consumer's premises. Where as the rest 74.53% is distributed by different companies. Before 1980, total energy was generated, transmitted and distributed by BPDB only. Presently, the largest organization could not run effectively with the fulfillment of consumer's demand. As a result, DESA, DESCo were created from BPDB (**APPENDIX-E**). REB captures a vast portion of the distribution areas of BPDB for the reason of loss and overall mismanagement.

Independent Power Plants (IPP) started their mission from 1998 and are increasing their position in power sector day by day. Presently IPPs generated 34.96% of the total energy. If IPP continues in such a way once IPP will control our power sector. If power stations under BPDB fail, the total market may go under control of IPPs and then if they form a syndicate, economy of the country will fall in danger. So for a competitive market, existence of power stations of BPDB is too much essential. Considering the importance mentioned above, Bangladesh Power Development Board (BPDB) has taken some managerial changes and reforms to increase its managerial strength. BPDB has taken a step to implement TQM techniques in its organizational areas from 2002.

#### 3.2 Present state of art of the research topic

The concepts of quality control as a distinct discipline emerged in the United States in 1920s. At that time quality control was intended to simply control, limit the escape of defective items in the industrial Processes. As the quality control concept emerged in the first half of the 20<sup>th</sup> century, numerous refinements occurred. Pioneers Shewart, Deming, Juran, Feigenbaum and others focused a more effective management philosophy on actions to prevent defective products from ever being created, rather simply screening out defective

items. Quality management continued to develop under Deming's guidance[2], which many regard as the father of modern quality philosophers. The historical movement of Total Quality Management is shown below:

Year	Activities related to Quality Management
1911	The principles of scientific management published by Frederick Taylor.
1920	Concept of Quality Engineering Introduced.
1924	H.F Dodge & H.G Roaming introduce concept of Sampling Method.
1924	W.A Shewhart introduces concept of Control Chart
1931	W.A Shewhart introduces concept on Statistical Quality Control.
1941	To train of Quality Control technique W.E Deming joins the U.S war department.
1947	International organization for Standardization was formed
1950	W.E Deming came to Japan and introduces a training course on Statistical Quality Control.
1962	Twenty Quality Control circle(QC) was formed in Japan
1978	First International Convention on Quality Control was held in Japan
1984	President Regan announced "Quality Month" in America.
1987	ISO 9000 series standard was established
1993	Training courses on Total Quality is introduced among the students of University, School and Colleges of America
2000	ISO 9001 Quality Management process

The Steps of TQM movement:



Total Quality Management is a developed management process by which many countries have reached at the peak of the development. Unexpressed knowledge and ideas of the general workers can be brought into daylight for the development of industries and products.

By this management process, unskilled and semiskilled workers make themselves expert through sharing their knowledge and experiences with expert workers. In this management system employees can enhance their ideas through discussing. TQM creates new consciousness and improvement of existing product or service in a new direction. As a result, most of the cases, the product or service gets the highest position in the competitive market.

Though Total Quality Management is implemented to solve the managerial problems widely in different countries over the world, the concept is new in Bangladesh. At first, Total Quality Management is introduced in Bangladesh Power Development Board for managerial improvement. Except BPDB, the program is not executed anywhere in the country. Though the practical application of Total Quality Management is new in Bangladesh, due to lack of proper guidelines and necessary steps from Government, the motion of the program is too much slow. Few literatures are found on TQM implementation especially in respect of our country.

The first guidelines ever prepared on TQM implementation especially in BPDB as a training manual in 2003. The manual includes historical evolution of quality, concept of Total Quality Management, Quality culture, how culture created, identify the cultural change needed to implement TQM, how culture can be changed, employee involvement and empowerment, commitment, leadership, quality circle, concept on 5W, 2H, 7 tools of TQM, steering committee, guidelines for Quality Circle formation in respect of BPDB. But the manual does not provide any suggestion to solve the problems if adverse situation arises to implement TQM.

Another document termed as '*Priority Issue (PI) Solving- By JICA, Japan*' [4]. The document focused on the procedures to solve the identified problems based on priority issue. The document describes how the identified problems in Quality Control (QC) circle may be classified as per importance. The guidelines provide information on activity of Quality Control circle. It consists a clear description about tools used to prioritize the identified problems in Quality Control circle. A recent valuable guidelines on Total Quality

Management is found in the literature is '*Total Quality Management*'- Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield, Mary Besterfield-Scare [5].

It covers not only the principles and practices, but also the tools and techniques. The document is divided into two parts. Part I covers the principles and practices of TQM. The basic concepts of leadership, customer satisfaction, employee involvement, continuous process improvement, supplier partnership, and performance measures.

Part II covers the tools and techniques of TQM, benchmarking, information technology, quality management systems, environment management systems, quality function deployment, quality by design, failure mode and effect analysis, products liability, total productive maintenance, management tools, statistical process control, experimental design, and Taguchi's quality engineering.

A recent document published on Total Quality Management by Scott Hill. The document focuses on TQM, Malcom Baldrige Award, Deming Prize, Continuous improvement, ISO 9000, Tools used in TQM, concept on PDCA cycle, concept on leaders, Quality control circle, Benchmarking, procedure to use different control charts, check sheet etc.

An important literature on TQM termed as 'Experience means avoid pitfalls' by Gregory J. Hale and Caroline G. Hemenway. The paper provides guidelines on training and teamwork required during TQM implementation in an organization. The paper states that- System thinking- today's solution don't becomes tomorrows problems.

System design- to meet user's requirements.

System development- is including users.

Using systems- to achieve compliance and continuous improvement in performance.

Team works- requires holistic view.

Scarcity of talents-means more training.

Another recent literature on Total Quality Management termed as 'Launching projects successfully with front-end project planning' by Phillip A Himmel farb, Ph.D. The paper highlights on some organizations that implemented TQM for improving managerial efficiencies and their activities has been mentioned in the respective paper as case studies. The paper provides information as planning process, like project mission and objectives.



tasks, risk analysis, resource requirements, team presentation etc. It also provides information about facilitators' roles throughout the project period. It also contains concept on true teamwork.

One of the aims of this study is to look at whether these approaches could be replicated for the improvement of Total Quality Management program in BPDB.

## CHAPTER 04

### METHODOLOGY

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#### 4.1 General

A systematic procedure has been followed to collect information during research. The procedure includes- visit to different offices of Khulna power station (KPS) to identify their activities, collection of primary information from different documents of KPS, visit to the respective field and preparation of questionnaires for workers and managers to find out the root causes of failure to implement TQM on the experience of field visit. Several management personnel and workers were interviewed about the cause of failure to implement TQM and about the way of remedies. While studying, the level of knowledge, education and skillness of managers and workers were taken into consideration. Data has been collected from Khulna Power Station (KPS).

#### 4.2 Research Methodology

The methodology used in this research covers the collection of information, screening the information to make the information more valid and reliable and analyzing them to reach at correct decision. Keeping this in mind, utmost care has been taken through out the research. The detail steps to accomplish the objectives of the study are stated below:

##### 4.2.1 Selection of Sample

The problems to implement TQM in different power stations under BPDB are mainly of similar type. As a result, not all the power stations of BPDB were taken into consideration while carrying out the research work. Data collected from one generating station named Khulna Power Station (KPS). During study, different categories of workers (Foreman C and D, Switch Board authority-A,B and C, electrician-A,B and C) and managers were interviewed based on the level of technical knowledge, experience, intimacy with TQM program and also educational level. The sample was kept relevant considering the time and cost. The sample size was kept limited to 120 for workers and 20 for Managers.

#### **4.2.2 Sampling technique**

The purpose of the research work is to investigate the causes of failure to implement TQM in power stations and to provide recommendations to develop the present situation of TQM implementation. So, to track out the causes of failure, the personnel related to TQM program was mainly involved in sampling. The suggestions of supervisors and managers were taken to improve the management system in the light of TQM.

#### **4.2.3 Period of Research**

Khulna power station is a large organization. A large number of staffs and officers are involved with it. It performs different types of technical and managerial activities. To make a study on KPS's management system is a bulky task. During study, technical and managerial activities performed by KPS, Power Supply situation, load management, installed and generation capacity, electricity cost, load shedding, system loss, per capita generation and consumption, service rules and other rules and regulations, CBA's activities etc. were covered in the research work.

Different categories of employees and managers were interviewed based on the level of technical knowledge, experiences and managerial performances. 120 employees and 20 managers were interviewed. The present performances of TQM directorate for the managerial improvement of BPDB including power stations were included thoroughly in this research work. All these information and data were collected with facts which was a voluminous work. As a result the study period was relatively longer. The research was carried out for two-year duration from July 2007 to June 2009.

#### **4.2.4 Instrument of the research**

Two sets of questionnaires were prepared to collect information through interview. The specification of the questionnaires is mentioned below:

1. Questionnaires for workers ( **Appendix-F**).
2. Questionnaires for Managers (**Appendix-G**).

The standard of the questionnaires was kept in such a level that it might be helpful to achieve the objectives. Except suitable knowledge on power station, it is impossible to make complete queries about any limitations related to managerial activities of power station

because some technical affairs are involved in each activity. Keeping this in mind, field visit was conducted several times in different offices under KPS for an informal discussion with managers and workers. Being intimate with the staffs, the record of progress of TQM implementation as yet in BPDB was collected.

During visit, the activities related to TQM implementation were also observed closely to understand the obstacles involved in each activity. Based on the knowledge gathered through the field visit in different offices under KPS and conducting primary field survey in the research field, 02(two) set of questionnaires were prepared. Before finalizing the questionnaires, it was discussed with the KPS's staffs of different level to avoid faulty and irrelevant questions. Workers were categorized into four groups such as high skilled (Foreman C and D), skilled (SBA-C, Electrician-C.), semi-skilled (SBA-A and B, Electrician-A and B,) and unskilled (apprentice lineman, labors).

#### **4.2.5 Procedures of data collection**

During research, data was collected from the respondents of the study with the help of prepared questionnaires. As mentioned before, the involved respondents in this study is with the TQM related personnel, the list of the personnel was prepared with their contact numbers. Some workers of Power station, supervisors and managers were interviewed at office place at office hours, the workers and labors who engaged in field were interviewed at office or field after communicating with them over mobile or any other way.

At the time of data collection when a respondent was requested for interview about the failure of TQM implementation, the researcher found them irritated in most of the cases. Especially in case of official staffs, they hesitated to explain about any question due to the fear of superior authority. In few cases when an interviewee was asked about any question related to TQM implementation, he was describing it frankly but when he was requested to give the description in written as per questionnaire he refused. Falling in such problem, the objective of the study was explained to each of the interviewee to establish belief.

The interview was both open and close ended. When the respondents were invited to give their suggestions to develop the situation of TQM program in power stations, such invitation was open ended, other wise the interview was close ended. When any interviewee faced

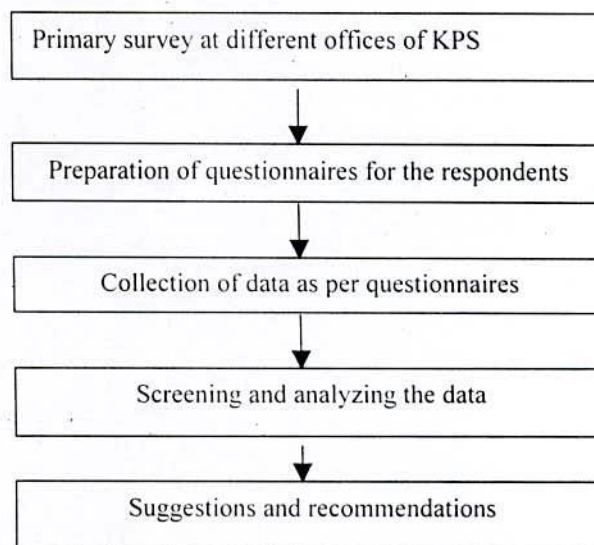
difficulties to understand any question, sincerely it was made clear to him. The respondents' were untouched or kept silent when there was possibility that the answer of any question would go against him or the organization. To overcome this problem, all possible efforts were given by the researcher to motivate them and after motivation they gave the information. After each interview was over, the questionnaire was checked carefully to avoid any possibility of missing.

#### **4.2.6 Data Screening and Analysis**

The collected data was screened to cut down redundant information. When any contradictory was arisen, the field was revisited to take interview again of the respective respondents. In such situation, if the questionnaire did not cover required queries, the respondents were directly asked different necessary questions. The collected data were analyzed and were arranged according to weight given by the respondents.

#### **4.2.7 Interpretation of the Results**

Collecting data from the respondents, after analyzing the causes of failure to implement TQM were detected and some recommendations were made to develop the situation of TQM program. The steps of the study are mentioned below in block diagram:



**DATA ANALYSIS AND RESULT**

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Two sets of questionnaires were prepared, data collection and analysis has been made separately to complete the research. While preparing the questionnaires emphasis was given to find out the causes of failure to implement TQM in power stations and suggestions for overcome the problems. When different persons were interviewed, the findings from different persons were significantly different and it was due to the variations of educational level and nature of workplace they work. So for analyzing data, interviewee was classified based on the education level and nature of jobs they perform. In total 120 workers (High skilled-30, skilled-40, Semiskilled-30, & unskilled-20) related with TQM program and 20 Managers were interviewed. Collected data has been grouped into two major types based on the questionnaires for workers and managers. Finally collected data has been placed in tabular format and analyzed to achieve the objectives of the study.

**5.1 Data Analysis based on the questionnaires prepared for workers**

**5.1.1 Categories of Workers Interviewed according to education level**

Everyone of Quality Control (QC) circle should have a clear conception on Total Quality Management, existing problems of working place for the successful implementation of TQM. Though power stations are a technical organization, most of its activities are technical. So, problems exist here are also technical. As a result, to realize the activities and technology involved in power station a worker must have education. While visiting the field it was found that an incident occurred for the first time and the members of QC circle considered it as a problem. But in light of TQM, problem is defined as such incident that occurs frequently. So, for this specific case the members of the mentioned QC circle have wrong conception. Again, to find out the root causes of a problem, any tools of seven tools (Control chart/graph, Stratification, Cause effect diagram, Pareto Chart, Histogram, Scatter diagram and Check sheet) of Total Quality Management is to be used. After finding problems, to eliminate it, cost benefit analysis is mandatory for TQM. It takes a minimum level of education for successful implementation of TQM. The interviewee workers were

classified based on their education to understand the education level of workers and is shown in **Table 01**:

Education level	Number of interviewee	Percentage
Illiterate	15	12.50
Up to primary	25	20.80
Up to S.S.C	55	45.83
Up to H.S.C	19	15.83
Graduation and above	6	5.00
Total	120	100%

**Table 01: Classification of Workers based on education**

### 5.1.2 Progress analysis of Quality Control circle (QC) considering education level

While visiting Khulna Power Station (KPS) as a part of study, it was found that there are four departments termed as Mechanical maintenance division, Electrical maintenance division, Instrument & Control division and operation division to perform maintenance and operational activities. There is also administrative department, Civil department and Security department to provide logistic support to the maintenance and operational departments. Like other departments of BPDB, thousands of problems both managerial and technical exist here. As a part of managerial improvement to rectify these problems TQM was introduced in Khulna Power Station in 2005. Quality Control (QC) circles were formed in every department of KPS through the office order of respective departmental heads. From very beginning, the motion of TQM program in KPS was very slow. There was no monitoring from higher authority. Also QC circle members did not take any initiatives to move the TQM program. Actually TQM program in KPS was limited upto forming QC circles. During visit, the activity of QC circles of every division was closely monitored. The number of QC circles in Instrument & Control division is 3(three), in Mechanical maintenance division the number of QC circles 5 (five) and in Electrical maintenance division the number of QC circles is 3(three). The records of meeting of different QC circles are summarized in **Table 02**:

Name of division	Name of QC circles	Level of education of supervisor of QC circle	No. of meeting (Target)	No. of Meeting (Actual)
Instrument & Control	QC circle-01	Bachelor degree	230	22
	QC circle-02	Below SSC	230	12
	QC circle-03	Bachelor degree	230	22
Electrical maintenance division	Bizli-01	Diploma(E & E)	230	10
	Bizli-01	Below SSC	230	08
	Bizli-01	Below SSC	230	08
Mechanical maintenance division	Bhairab	Diploma(E & E)	230	12
	Modhumoti	Below SSC	230	06
	Rupsha	HSC	230	08
	Sundharbon	Below SSC	230	04
	Shapla	Below SSC	230	03

**Table 02: Records of meeting of QC circles in Khulna Power Station**

From table 02 it is seen that target of arranging meeting was 230. Actually, the numbers of meeting held is too less than the target numbers. The figure indicates the picture of failure of TQM program in Khulna Power Station (KPS). The maximum number of meeting organized by QC circle 01 and QC circle 02 of Instrument & Control division. It is remarkable that the level of education of the supervisors of those groups which arranged maximum number of meeting are higher than the other QC circle's supervisors. It is also remarked that the circles which supervisor's have education below SSC, their performance is very alarming. So, education plays a vital role for successful TQM program.

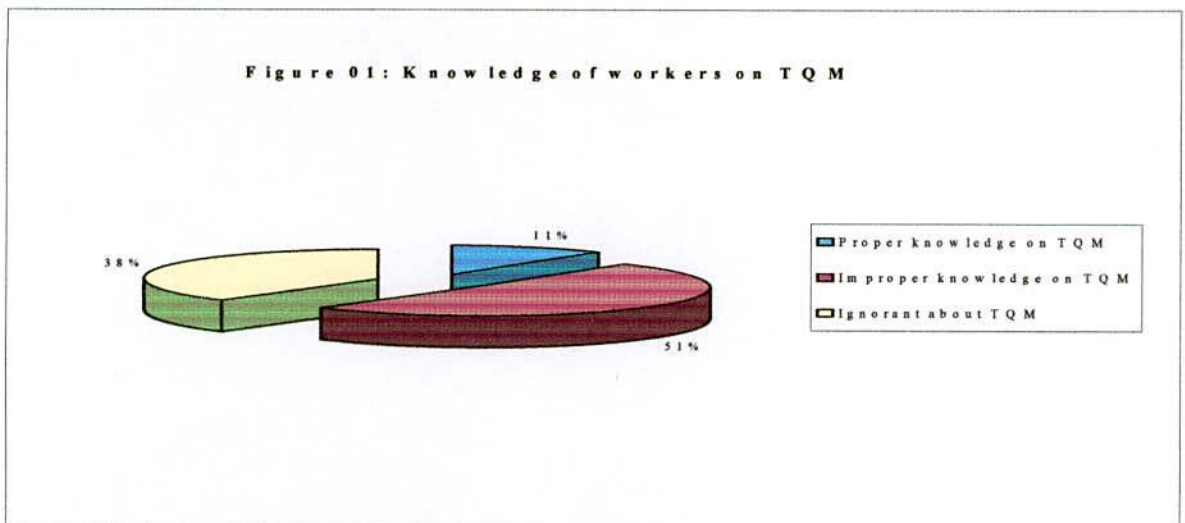
### **5.1.3 Knowledge of workers on Total Quality Management**

In traditional management system, top management is the sole authority for decision making. Decisions are taken from top level management and imposed to the field workers through the mid level and bottom level managers. But in Total Quality Management, decisions are taken from field level workers and then it is initiated to top level through proper chain. Workers are involved and empowered in Total Quality Management. Quality



Control circles formed with field workers (QC) are the primary levels of decision making in TQM. Each Quality Control circle (QC) contains 4-10 members. The members of Quality Control circle will discuss among them to find out the existing problems in their working place. At least, one meeting per week must be held. The meeting may be held either in working place, outside the working place or even in a restaurant. An officer of equivalent sub assistant engineer (SAE) or assistant engineer (AE) termed, as facilitator of QC circle will provide necessary support for arranging meeting. The problems find out in the meeting of QC circle will be summarized according to their importance. The members of QC circle also solve the problems discussing among them. The problems for, which need help of higher authority to solve, will be thrown to top management through proper channel.

Though Quality Control (QC) circle is formed with field level workers and they are the primary levels of decision making in TQM system, they should have clear knowledge on TQM. In this study, the knowledge of workers on TQM was tried to find out. During data collection, the interviewees were asked different questions on TQM. The interview session was kept open ended. Among 120 workers 13 workers were found clear knowledgeable on TQM, 61 numbers were found partially knowledgeable and rest 46 were found ignorant. The percentage in shown in **figure 01**:



#### **5.1.4 Knowledge of workers on existing service rule**

BPDB has service rules. All the activities of Khulna power stations (also other power stations) are regulated as per guidelines of the service rule. It provides guidelines both for officers and employees. Officers and employees perform their duties as per service rules. The present adverse situation of power stations is due to the bad impact of present service rules. Though the service rules have a great influence of the activities of power stations, the service rules have been studied thoroughly and discussed with the workers to be informed about their knowledge on service rules. Discussing with the workers defect of present service rules are identified and stated below [6]:

There are nine categories of officers from sub assistant engineer to chairman in BPDB. Generally Sub-Assistant Engineer, Assistant Engineer/Sub-divisional Engineers are involved in supervisory level. They directly control employees and supervise the works. Executive engineer, superintendent engineer, additional chief engineer etc. are mid level managers and they are involved to carry the orders of top management. The mid level managers do not directly supervise the works. They are not generally able to solve the root level problems of the works because they involved themselves in paper works most of the time. From chief engineer to chairman is top level management. Top level management is involved in decision making and they discussed with mid level managers for this purpose. As a result most of the project do not get cent percent success because ideas of lower level managers do not coincide with the decision of top level managers.

Service age of entering in BPDB for all employees and managers is 30 years and retirement age is 57 years. If a person above 30 years having skill in works can not be appointed according to service rules.

All promotion, annual increment depend upon the seniority of the first appointment. This results that employees need not require special qualification, special performance or quality works. What ever may the performance, all categories of employees or officers get the selected salaries and other benefits stated in service rules. Ultimate results show that employees or managers are not eager to earn knowledge. There is no provision for extra benefit for quality works, so the staffs are not conscious to assure quality.

There is provision of overtime allowance for employees for extra time works beside office hours. This opportunity has a bad influence on the activity of workers. Due to having this provision, most of the workers feel discourage to work at normal office hours. They waste the normal working hours by gossiping with colleagues at working place and tend to work after office hours to get overtime benefit. As a result employees become inefficient.

As per present service rules, the performance of an employee or officer is evaluated by annual confidential report (ACR) at the end of every calendar year. Though there is a guideline for rating ACR, most of the superiors rated the ACR as their will. If, the relation between a subordinate and his supervisor deteriorates due to any reason whether it may unofficial, there may be a possibility of poor rating in ACR of the respective subordinate in such cases. An employee does not get any information of adverse rating in ACR before a certain period, as the ACR is confidential. Due to adverse rating, he may not get promotion, increment or other benefit. The victim becomes frustrated. Normally no actions are taken against the superior for violating the guidelines for ACR writing. The present ACR system should be open rather than confidential.

An officer or employee cannot leave the job before 25 (Twenty-five) years service age. If an employee want to leave job due to physical disability or getting better chance before this period, he will not get any service benefit. As a result, the employee will be frustrated.

For the successful implementation of TQM, it is necessary to motivate the workers that TQM is better than traditional management. So, an employee should have clear knowledge on present service rules to compare it with TQM. In accordance with the importance, the workers were asked about their conception related to present service rules. The interview session was kept open and close ended. To know about the defect of present service rules, the interview session was kept close ended otherwise the session was kept open ended. Most of the workers were found ignorant about service rules. Though few workers were found aware of service rules their depth of knowledge was not upto the mark.

The percentage of workers is shown in **Table03**:

Respondents	Knowledge on present service rules	
	Yes	No
Number(120)	15	105
Percentage(100%)	12.5	87.5

**Table03: Knowledge of workers on present service rules**

### 5.1.5 Existing problem in KPS

The purpose of establishing BPDB was to generate and supply reliable power to the consumers. But, the purpose of establishment BPDB has not yet been fulfilled. Consumer growth rate of BPDB is very poor and it is 4.5% on an average (**APPENDIX-H**). Presently it has possible to take 30% of the total citizen under electrification. The rest citizens are still away from the opportunity of using electricity. If the growth rate is not increased, it will be quite impossible to electrify the whole country within 2020. BPDB can generate 63.56% electricity of its installed capacity. The daily generation is less than the daily demand. As a result load shedding is the common phenomenon in our country (**APPENDIX-I**). Total numbers of failure (part and full) of national grid of Bangladesh was 141 in 2006 and it is alarming. The system loss of PDB is 19.06% (without REB) (**APPENDIX-J**) and bill collection is also poor. The organization has become a loosing concern of Bangladesh Government. Though PDB is the largest power sector in Bangladesh, to ensure sound and profitable operation of power plants under PDB is too much essential for our country. Keeping this in mind, it was tried to find out the existing problems of KPS in this study. Discussing with the workers, the following problems were identified.

1. Lack of management commitment
2. Failure in planning
3. Inefficient organizational activities
4. High operating cost
5. Crisis in power generation
6. Excessive employees
7. Defective procurement system
8. Misguided Collective Bargaining Agent

## 9. Indiscipline in management

### 5.1.6 Main cases of failure to implement TQM in KPS

The main objective of the research is to find out the causes of failure to implement TQM in power station. In accordance with the objective, the workers were asked about the cause of failure. The interviewees were asked to choose a question from a set of prefixed causes, which he considered as the main cause of TQM program failure. The causes were summarized as per weight given by the workers. Weight means the number of workers supported the cause. The cause mentioned by the workers mentioned below:

Lack of commitment of higher authority.

Insufficient knowledge of workers on TQM

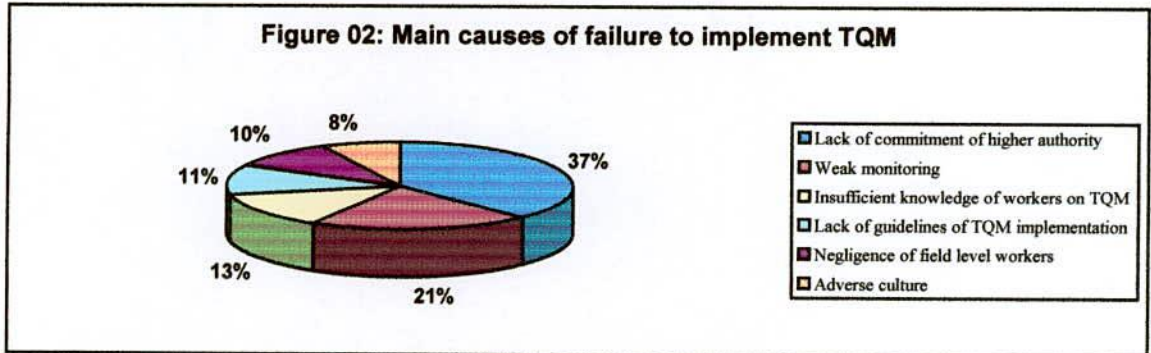
Weak monitoring system

Negligence of field level workers

Lack of guide lines of TQM implementation

Adverse culture

The causes mentioned by workers are shown in figure 02 as percentage wise.



### 5.1.7 The way to change culture

An organization's culture is the every day manifestation of its underlying values and traditions. It shows up how employees behave on the job, their expectations of the organization and each other, and what is considered normal in terms of how employees approach their jobs. A quality culture is an organizational value system that results in an environment that is conducive to the establishment and continual improvement of quality. It

consists of values, traditions, procedures, and expectations that promote quality. One of the greatest problems to implement TQM in KPS is the cultural barrier. Most of the employees of different offices of KPS come at late in office. Normally, during office hours they passed their time by gossiping in working place. Though there is a provision for extra payment for extra time works termed as over time, usually they are unwilling to work during office hours. After office hours, they tend to do work and claim extra benefit for such work. The management is unable to keep abstain them from such illegal activities due to pressure of Collective bargaining Agent (CBA). This culture is too much adverse to implement TQM and a cultural change is very essential.

While visiting field most of the workers refused their in co-operation during office hours. But when the supervisory level were motivated and asked most of them confessed the truth. The supervisors were asked about the way to engage the workers in work during office hours. The suggestions of the supervisors are summarized below:

- Continuous monitoring of higher authority.
- Arranging co ordination meeting regularly and discuss the matter with them.
- Taking necessary legal action against any irregularity
- Creating rules for fixed benefit rather than over time system
- Taking motivation program to improve morality
- Others

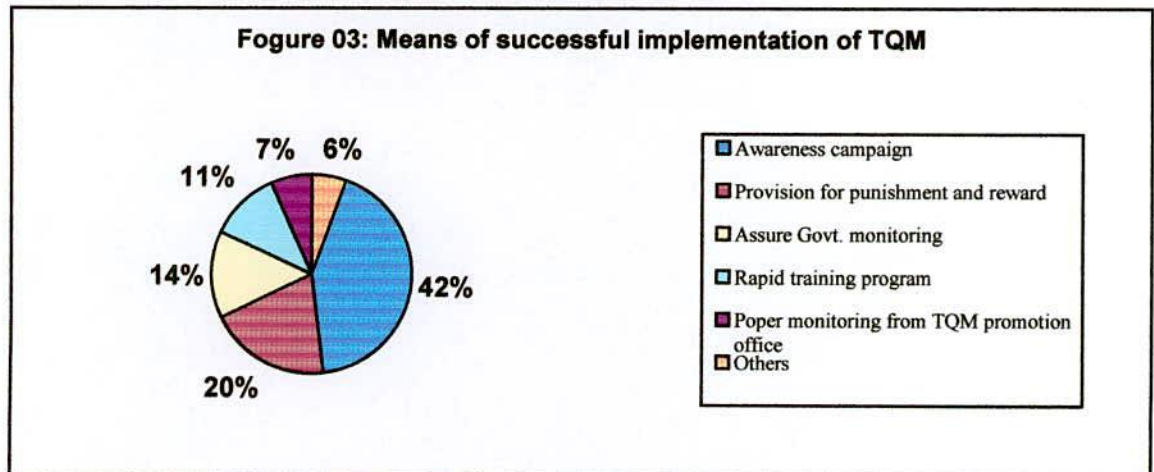
#### **5.1.8 Recommendations for successful implementation of TQM in KPS by workers**

Though failure of TQM implementation in KPS is due to the negligence of both managers and workers, joint effort is essential to prevent it. During this study, it was tried to inquire about the means of successful implementation of TQM in KPS from workers and managers respectively. In this regard the workers were interrogated to bring the limitations in daylight. Though KPS is a Government organization, and Collective bargaining agent exists here, the workers are very open to give their comments against managers. As per comments of workers, it was observed that there was no supervision of QC circle's activities from managers. The record of meeting of QC circles highlighted in **Table 02** is very much consistent with the comments of the workers. A supplementary question was asked about the

way of successful TQM program in KPS. In total 120 workers 106 workers answered this question. The means suggested by workers for the successful implementation of TQM in KPS are presented below as priority basis with percentage.

SL. No.	Suggestion	No. of workers supported	Percentage
1.	Awareness campaign	45	42.45%
2.	Provision for punishment or reward	21	19.81%
3.	Assure Govt. monitoring	15	14.15%
4.	Rapid training program	12	11.32%
5.	Ensure proper monitoring from TQM promotion office	07	6.60%
6.	Others	06	5.66%
		106	100%

Table 04: Means of successful implementation of TQM in KPS



## 5.2 Data analysis based on the questionnaire for managers.

### 5.2.1 Education level of managers

Khulna Power Station is technical organization. Most of its activities are technical. Operation and maintenance of grid lines, power station, grid lines and sub-stations are technical works. The managerial process related to these works like preparation of work plan, procurement of necessary goods, preparation of tender document, tender invitation and monitoring works are part of technical management. On the other hand, pure administrative works, accounting related works and dealing with other offices are part of general management. Two types of managers work parallel in KPS due to the nature of works stated in service rules. The technical managers give emphasis on technical works where as non technical managers give emphasis on general administrative works. As a result, like other technical offices, a mental gap exists between the technical and non-technical managers. When TQM was initiated in KPS, the technical managers considered it as a pure managerial development program and they actually did not take it as their program. As a result, from very beginning of initialization, the program stumbled. In case of technical managers technical sides become infirm than managerial sides and vice versa. This infirmity is the direct reflection of manager's background of education. Since, the education background has great influence of TQM program in KPS, the level of education of manager's was considered during study. The level of education of managers is shown in **Table 05**.

Serial No.	Level of education	Number (Technical)	Number (Non technical)
01	HSC/Diploma	04	00
02	Bsc Engg./ MSc	12	04

**Table 05: Level of education of Managers**

### 5.2.2 Knowledge of managers on Service rules and Electricity Act-1910

The activities of Khulna Power Station are regulated by Electricity Act-1910, different ordinances and its own service rules. While performing different activity management get into various types of trouble. Management has to take legal action against consumers/public in different times to keep them ceased from illegal activities. Public also take legal action



against management when they fail to preserve their right either legal or illegal. Management faces such situations according to Electricity Act-1910.

In Electricity Act-1910, clear guidelines are provided for both management and consumers. The rules to be obeyed for each activity are discussed section wise. Rules related to inquiries are given in section 33 of this act, Requisition for police assistance is given in section 54B, criminal offences and procedures are mentioned in section 39 to 50. Line construction rules, rules for building public or employees awareness are also provided in this act[7].

The post of legal advisor exists in BPDB. Normally legal advisor proceeds for most of the cases. The legal advisors are not technical people. Since most of the activities of BPDB are technical, sometimes-legal advisor could not understand the technical sections of this act. Management has to support legal advisor in such situations.

BPDB has it's own service rules. In this rule, there are 20(twenty) chapters. The procedures of administrative works are specified in service rules. The service rules provide rules of appointment, retirement, promotion and increment of an employee, rules of allowances and other service benefit of workers and officers, rules of leave, office management procedures, rules for taking legal action against anybody. Actually guidelines for maintaining office are provided in service rules. Managers are liable for the successful implementation of TQM. Managers should be able to detect the limitations exist in present service rules.

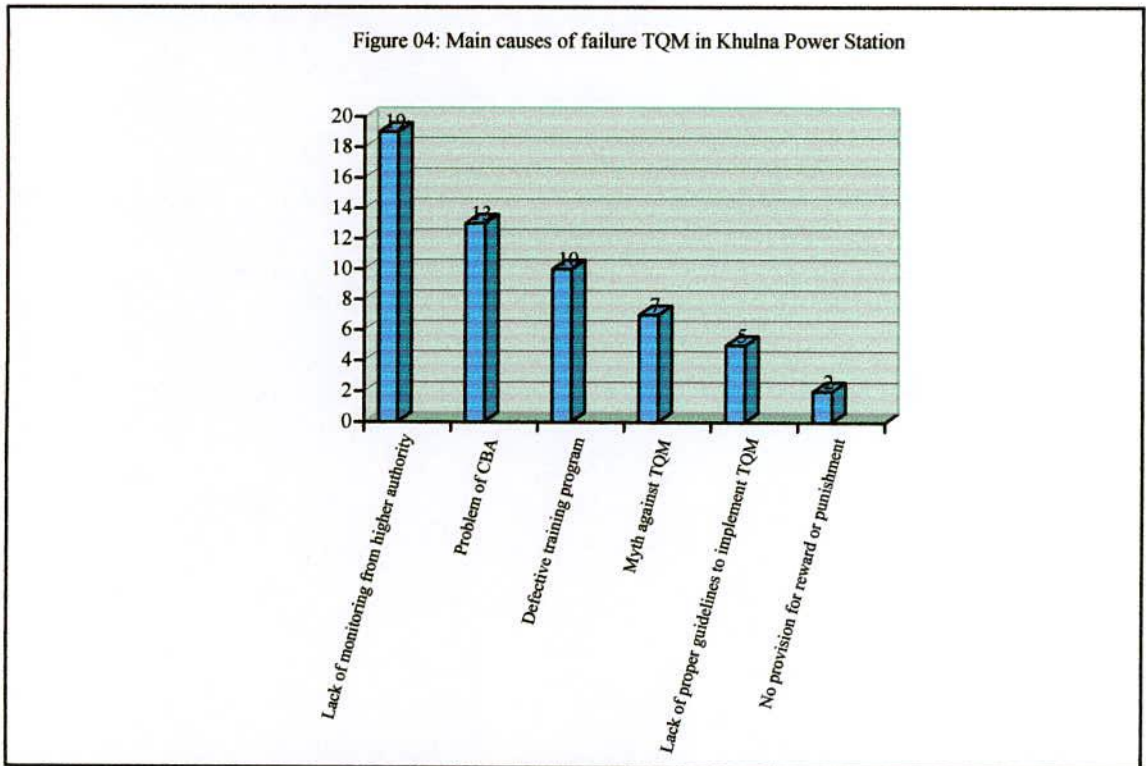
So, for successful implementation of TQM in KPS, managers should have sound knowledge on electricity act-1910, different ordinances and service rules. During interview mangers were asked about Electricity Act-1910 and other ordinances.

Respondents	Knowledge on Electricity Act-1910 and other ordinances		Knowledge on Service rules	
	Yes	No	Yes	No
Number(20)	14	6	20	0
Percentage (100%)	70%	30%	100%	0%

**Table-06: Knowledge of Manager's on electricity act and Service rules**

### 5.2.3 Main causes of failure to implement TQM in KPS

Negligence to follow rules & regulations are from behavioral attitude of human being. The tendency is severely observed in case of illiterate and less educated people. Since workers belonged to this group, the rules breaking tendency are as usual from workers. The workers can be made bound to follow rules & regulations if they are supervised properly by the managers. For proper supervision the managers should have a sound knowledge about the causes of failure to implement TQM in KPS. In this session, managers were asked different types of question to verify their knowledge level about causes of TQM program in KPS. The session was kept open ended. When the managers were asked to mention some causes of failure, most of the managers mentioned more than one cause. The mentioned causes liable for TQM program failure in KPS are listed in **figure-4**:



It is seen from figure-04 that nineteen managers mentioned lack of supervision from higher authority as the cause of failure TQM program in KPS. The causes mentioned by managers are almost similar with the causes mentioned by workers.

#### 5.2.4 Main obstacles to implement TQM

From the analysis of the previous section, it is clear that failure of TQM program in KPS is due to lack of proper guidelines and monitoring from the superior authority. While visiting field, negligence to TQM was observed in everywhere of KPS. In this session, the obstacles to implement TQM were tried to find out. Obstacles to implement TQM are not limited to the field level workers but spreader upto the top management level. So to discuss all the obstacles openly was problematic. Considering the problem, the session was kept both open and close ended.

While visiting Khulna Power Station, it was found that TQM program is actually closed there. All the QC circles do not arrange meeting regularly. The management does not monitor the QC circles activity. The management also does not provide them proper logistic support for arranging QC circles meeting or other activities. The limitations found in this organization are:

1. There is no standard manual for TQM implementation especially suitable for KPS.
2. Awareness program needed to improve the worker's interest towards TQM is fully absent here.
3. Improper training on TQM.

Finding these limitations, the managers were asked about the obstacles to implement TQM in KPS. Discussing with managers, the obstacles to implement TQM in KPS are found as follows:

##### 1. Improper training

Bangladesh Power Development Board (BPDB) has a training directorate. TQM promotion office and training directorate jointly arranges training courses on TQM both for employees and officers of BPDB (including power stations). The duration of each training course comprises of 10-12 trainees is at best 10 days. If the motion of the training courses remain so, to train all the staffs of BPDB will take several years. Again the evaluation system of present training is defective and is not suitable for the trainees to earn about TQM. In training classes, the lecturer normally delivers his lecture and the trainees listen to him. In the closing ceremony, as a part of evaluation the course, a trainee as a respondent of all

trainees is invited to give his lecture on training course. Then the invited guest distributes certificate among the trainees and close the program congratulating all. Though there is no evaluation of the trainees, the trainees regard the course and do not feel interest to learn through training course. If, there is provisions of fail or pass as a part of evaluation and it would have a reflection in promotion or increment of the employee, the trainee would be more attentive and the courses must be fruitful. So, evaluation technique of the trainees needed to review.

## **2. Pressure from collective bargaining agent (CBA)**

Collective Bargaining Agent CBA is an obstacle to implement TQM. In respect of our country, CBA in every organization is uncontrolled. CBA always avail illegal benefits from authority to keep them in trouble. CBA is strongly liable for the present adverse situation of KPS. They want to keep this situation alive for their interest. They misguide the workers that TQM is a foul management system and it is a part of privatization. If TQM is effective in BPDB, the excessive employees will be terminated. The general workers being misguided believe them and they do not feel interest for TQM.

## **3. Adverse service rule**

Present service rule of BPDB is very much traditional. According to these rules to take legal action against an unruly employee is time killing. As a result, the management does not show interest to take legal action against employees in case of any irregularities. For this reason the employees of KPS has become uncontrolled. Again as per present service rule, there is provisions of different type allowances for employees like over time allowance, washing allowance, travel allowance, shift allowance, medical allowance and other convinces. So the employees are more beneficiary than officer as per present service rule. Most of the present employees have the myth that if TQM is effective in KPS, they will lose these extra allowances. Again, some employees have belief that they will not be able to suit with this modern management system in the light of TQM and will lose their jobs.

## **4. Cultural barrier**

Present culture of KPS is too much adverse to TQM culture. For TQM implantation to change this culture is very essential but it is difficult. The higher authority should be

positive with these changes. First of all, supreme authority must be satisfied with TQM culture and then it is necessary to give a clear conception about TQM among the employees through TQM promotion office.

#### **5. Less budget to TQM program**

There is no extra allocation for TQM in budget of KPS. For every meeting of QC circle, each member gets ten taka as entertainment. The amount is too less that the members of QC circle do not feel interest about QC circle meeting. Except this entertainment bill, there is no extra benefit of the QC circle members that motivate them towards TQM. No budget is allocated for awareness campaign.

#### **6. Lack of proper guidelines**

There is monetary involvement to solve few problems identified in QC circle. But there is no clarification of fund of this amount in the guidelines provided by TQM promotion office of BPDB. Even no guidelines on problem identification are provided by TQM promotion office in QC circle meeting. The scope of works of facilitator is also not provided in guidelines of TQM promotion office. Lack of guidelines is an obstacle to implement TQM.

#### **5.2.5 Recommendations for successful implementation of TQM in KPS**

In this session, the means to prevent failure TQM program in KPS as per manager's view was identified. The session was open-ended. A question was asked to verify the manager's knowledge about the means of successful implementation of TQM in KPS. Most of the managers mentioned more than one means. Most of the managers insisted on ensuring proper monitoring from TQM promotion office.

The managers gave emphasis on awareness campaign like motivation meeting, power point presentation, encourage employees through reward etc. Some managers gave emphasis on proper training to develop the skillness and technical knowledge of the workers towards TQM. Few managers suggested giving punishment or reward of the team leaders in case of failure or success in QC circle activity. The managers especially in executive level emphasized to increase continuous monitoring of the workers by the lower class managers.

The suggestions provided by the managers are summarized in **Table-07**:

SL. No.	Means of successful implementation of TQM in Khulna power station	No. managers supported	Percentage
1.	Ensure proper monitoring from TQM promotion office	16	30.76%
2.	Continuous supervision from higher authority	11	21.15%
3.	Awareness campaign	9	17.30%
4.	Provide proper training	7	13.46%
5.	Provision for reward or punishment	5	9.61%
6.	Others	4	7.60%
Total		52	100%

**Table-07: Means of successful implementation of TQM in KPS.**

It is seen from table-07 that nearly 31% managers emphasized on ensure proper monitoring from TQM promotion office. The total weight given to ensure proper monitoring from TQM promotion office and continuous supervision from higher authority in combine is above 52%. This figure shows on which measure to be emphasized for successful TQM implementation in KPS.

DISCUSSION AND RECOMMENDATIONS

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**6.1 Discussion**

It is essential to success in a business. As the world changes, business will expand with its changing nature. Total Quality Management ensures the demand of customers in this changing nature of business. Creation of a TQM culture requires top management commitment and direction to ensure the right attitude for improvement of organization environment. It also requires a well-developed Quality Management System (QMS) which defines managerial processes and describes how they are to be integrated with all internal and external Customers, Suppliers and related Service Providers.

In conclusion, some problems have been described which exist as barrier to implement TQM in KPS with necessary solutions i.e. recommendations. If the problems to implement TQM, are not being eliminated application of TQM in BPDB (power stations) will not be easy. Traditional management culture creates these problems. Reward for quality work and punishment for misconduct is one of the most important solutions. Employees and management must be motivated to quality culture. For this, motivating factors must be strong and efficient.

During field visit, it is found that the workers are aware about the causes of failure of TQM in KPS like Lack of commitment of higher authority, Insufficient knowledge of workers on TQM, Weak monitoring system, Negligence of field level workers, Lack of guidelines of TQM implementation, Adverse culture were also identified unanimously by workers as causes of failure of TQM in KPS. Most of the managers were agree with the causes mentioned by workers.

When the workers and mangers were asked about the way of successful TQM program in KPS, they claimed that no effective monitoring by higher authority made yet. Moreover, they provided some suggestions that include monitoring from TQM promotion office,

continuous monitoring from higher authority, raising awareness, ensuring proper training, provision of reward or punishment etc.

An effective model is needed which can create an environment to implement TQM. Present paradigm or concept of traditional system must be shifted to new quality culture. Quality thoughts must be grown among the employees and managers. Preference should be given to the participative management than control management. Resistance will appear during TQM application but sufficient steps and motivating factors can demolish those resistances to implement TQM. It is noted that TQM implementation in BPDB (power stations) is one kind of paradigm shift. So, top management must be committed and involved them to eliminate all kind of resistances through quality culture. Top management vision and mission must coincide with middle management, bottom management and the general employees. Employees or their representatives must be involved in decision making from the scope and overall approach of the TQM process to teams engaging in quality analysis and suggestions for improvements. When all staffs of the organization will be dissatisfied with the present management system, then Total Quality Management implementation will be easier.

## **6.2 Recommendations of the research**

Total research work has been completed depending on the facts, data, information and opinions of the employees and officers in the research field. All research work finds out the managerial problems in BPDB (Power Stations) for TQM implementation. To eliminate these managerial problems some recommendations are made below which will be helpful to implement Total Quality Management in power stations under Bangladesh Power Development.

### **(I) Cultural change is essential**

To implement TQM in power plants under BPDB a cultural change is essential and the higher authority should be positive with these changes. First of all, supreme authority must be satisfied with TQM culture and then it is necessary to give a clear conception about TQM among the employees through TQM promotion office.





## **(2) Rapid Training Program**

Training Directorate of BPDB introduces training program as per guidance of TQM promotion office. The state of moving training program is very slow. At best two training courses are organized comprises of 10-12 trainees in a month. If the motion of training program remains so, to train all the employees of BPDB will take several years. The training program should be quicker in motion than the present state to implement TQM within a short time.

## **(3) Providing necessary logistic support**

Logistic support is very much important to solve the problems to implement TQM. TQM system always favor logistic supports. Without logistic supports many problems are not easy to solve. Then, Quality Control (QC) circle members become misguided to solve their stated problems. Due to not providing logistic supports different types of crisis are as usual in power stations of BPDB. Crisis is one of the most important factors that led to employees in frustration. To overcome these situation necessary logistic supports is mandatory from higher authority.

## **(4) Proper monitoring from Government**

Current situations in power stations of BPDB are lack of management commitment, unethical behavior of managers and employees, traditional culture, absent of participative management, financial crisis among the employees for completing their jobs, improper planning and dissatisfaction of both internal and external customers etc. Proper monitoring is essential from government to solve these problems

## **(5) Awareness Program**

Most of the managers, union leaders and employees are not dissatisfied with these present situations because they have the self-interests. They involve themselves in corruption and earns huge amount of money. Some of them are applying legislative power to fulfill their interests. Many of the employees are afraid about the changes in light of TQM. They are afraid that they may not adapt with the new changes and may loss their jobs. They are very much afraid that they may not suit themselves in the modern management after

implementation of TQM. To overcome these situations, an awareness program must be carried out among all the employees of power stations of BPDB.

#### **(6) Visionary leadership**

When all employees of power stations under BPDB will be aware of their current reality of present traditional system and the bad future like BJMC or BCIC, they will be careful about their present haphazard situation. They should be aware that they are not getting better payment for their works and in the next they will fail to survive in the competitive market. A visionary leadership can inform them with the betterment of the future initiatives in the light of TQM implementation. Then the dissatisfaction in the organization will occur and will be easier to implement TQM.

#### **(7) Unethical behavior should be rectified**

In BPDB, unethical behaviors are very much common. Threats, misconducts, waste of time, waste of materials, are available in this control management system. To eliminate these behaviors, ethical management program must be set among the whole organization. The consciousness of every employee grows through ethical management programs. This types of videos that develop ethical sense, leaf let. papers, magazine may be distributed among the managers and employees. It must be noted that unethical behaviors create mistrust among the staffs in the organization.

#### **(8) Participative Management is essential**

Presently, administration of BPDB (power stations) is beaucroatic and centralized. The legislation power is thrown from the top of the management to bottom. Most of the time, the decision-making authority is not experienced with the working field. So the mission of the top authority does not coincide with the field level staffs in most cases. In BPDB, an adversarial relationship exists in working place. Employees do not help each other to sustain their individual status. BPDB must create such a participative management so that every employee will work for the common goal and share the benefits. A participative management culture is essential to overcome these problems. In such management

Employees help each other to reach the goal as they get the common benefit from the organization. Ideas grow among the employees so that organization gets the result of continuous improvement.

### **6.3 Conclusion**

The key to an effective TQM program is its focus on the customers. An excellent place to start is by satisfying internal customers. TQM is an organizational-wide challenge that is every one's responsibility. All personnel must be trained in TQM statistical process control (SPC), and other appropriate quality improvement skills so they can effectively participate on project teams. Including internal customers and, for the matter, an internal supplier on project teams is an excellent approach. Those affected by the plan must be involved in its development and implementation. Changing behavior is the goal. Employees must come to work not only to do their jobs, but also to think about how to improve their jobs. Employees must be empowered at the lowest possible level to perform processes in an optimum manner. Management must participate in the quality improvement teams and also act as coaches to other teams. A quality council must be established to develop a clear vision, set long-term goals and direct the program. An annual quality improvement program is needed to establish and involves input from the entire work force. Finally, it is concluded, TQM must be successfully implemented in Power Stations under BPDB if management realizes that TQM is a better way to run an organization properly.

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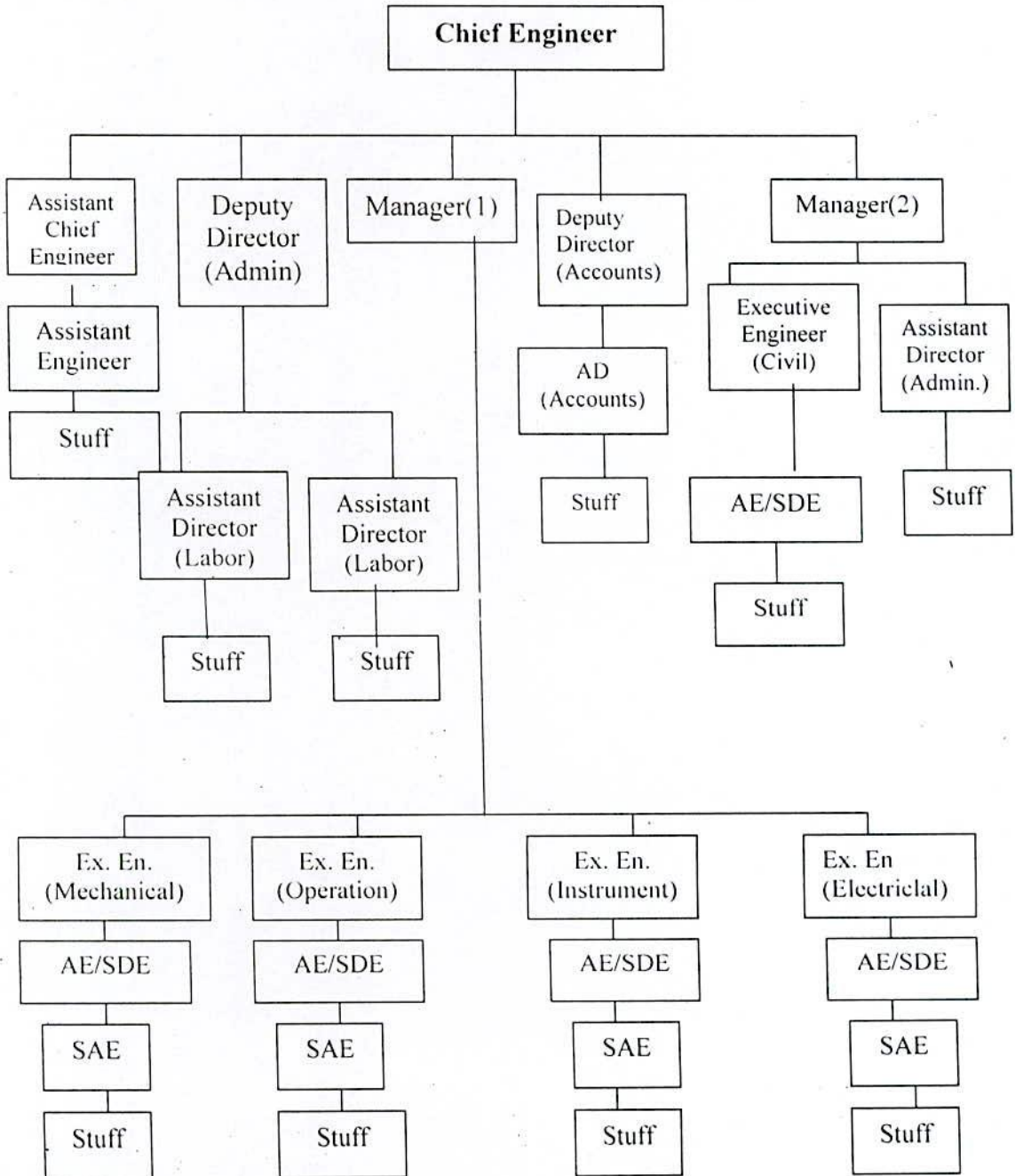
## Power Supply Situation in Power Sector (Five years plan and achievement)

Item	2001-2002 (Achieved)	2005- 2006 (Target)	2005-2006 (Achieved)	Addition (Target)	Addition (Achieved)	2011-2012 (Target)
demand (MW)	3218	4967	4693	1749	1475 (84%)	7887
Installed Capacity (MW)	4230	6759	5245	2529	1015 (40.13%)	9564
Distribution line(Km)	41657	45657	46599	4000	4942 (123%)	51657
No. of Consumers (Lakh)	16.45	19.7	15.18	3.25	-1.27 (39%)	24.45

## Interruption of national Grid in 2006

Sl. No.	Type of fault	Total number of failure	Total duration hours/minutes
1.	Partial power failure due to trouble in grid transmission	23	12/57
2.	Partial power failure due to trouble in generator	79	23/00
3.	Partial power failure due to fault in transmission line	22	12/52
4.	Partial power failure due to the lightning transmission line/stormy weather	12	07/02
5.	Partial Grid failure	05	1/39
6.	Total Grid failure	---	-----
	<b>Total</b>	<b>141</b>	<b>57/30</b>

Organ gram of Khulna Power Station, BPDB, Khulna



### Installation capacity and actual generation in power sector

Power Sector type	Capacity in MW		Generation in GWh	
BPDB	3985	(75.97%)	14456	(63.56%)
IPP	1260	(24.03%)	8286	(36.44%)
TOTAL	5245	(100.00%)	22742	(100.00%)

### Classification of power plants based on fuel

Engine type	Capacity in MW	Percentage
Hydro-electric	230 MW	4.39%
Steam turbine	2688 MW	51.25%
Gas turbine	1099 MW	20.95%
Combined cycle	990 MW	18.88%
Diesel	238 MW	4.53%
Total	5245 MW	100.00%



### Electricity sales by different distribution organization

Distribution Area	Year Started	Location	Percentage
DESA	1991	Dhaka Metropolitan City	39%
DESCo.	1996	Dhaka Metropolitan City	3%
BPDB	1972	Bangladesh	32%
REB	1977	Bangladesh	26%

### Area wise electricity served by different distribution organization

Distribution Area	Location	Percentage
DESA	Dhaka Metropolitan City	9%
DESCo	Dhaka Metropolitan City	2%
BPDB	Bangladesh	27%
REB	Bangladesh	62%

## Survey Data Sheet

Prepared for the Project Work for M.Sc. Engineering Degree

Instrument for the Workers

1. Name of the Organization :
2. a) Name of the Interviewee :
- b) Designation :
- c) Level of Education :
- d) Age :
3. Category of the Employee : 

High Skilled
--------------

Skilled
---------

Semi Skilled
--------------

UN Skilled
------------
4. Working Experiences in this job(Years) :
5. Involvement with TQM program: 

Member of QC circle
---------------------

Facilitator
-------------

Others
--------
6. Do you have any idea about the existing problem of BPDB? Yes/ No
7. If yes, mention few of them.
8. What is TQM?
9. What are the basic difference between TQM and traditional management?
10. Do you think TQM is a better management system?
11. Do you think TQM is suitable for BPDB?
12. What is Quality control (QC) control circle?
13. Do you know about the number of members in a QC circle?
14. Do you know about the 7 tools of TQM?
15. What is facilitator?
16. In respect of BPDB, which category of employee should be appointed as facilitator?
17. Do you have any idea about steering committee?
18. Do you know the rules of arranging QC circle meeting?
19. Do you know the status of present activities of TQM in BPDB?
20. Do you know about TQM promotion office?

21. Do TQM promotion office monitor TQM activities properly?
22. Do higher authority of BPDB supervises TQM activities?
23. Is there any awareness campaign towards TQM in this organization?
24. Do you have any training on TQM?
25. Is there any depart responsible for training course on TQM?
26. Is present training system suitable for successful TQM program?
27. If not, what kinds of change needed in present training system?
28. What do you think about the main cause of failure of TQM program in BPDB?
  - a) Lack of commitment of the higher authority
  - b) Insufficient knowledge of workers on TQM
  - c) Weak monitoring system
  - d) Negligence of field level workers
  - e) Lack of guide lines to implement TQM
  - f) Adverse culture
29. Do you know about Electricity Act-1910 or other necessary ordinances?
30. What is the name of your department?
31. Is there existing any interdepartmental co-ordination problem?
32. How many employees work in your department?
33. Is PDB is a loosing organization?
34. What are causes of making loss as per your opinion?
35. Do you have any idea on present service rules? Yes/ No
36. Do the employees of BPDB follow the service rules?
37. Do you know about the limitations of present service rules?
38. If yes, what the problems?
39. What is present evaluation system of the performance e of the employee?
40. If present system is defective? Y/N
41. If defective, what are the defects?
42. Is there any labor or workers union (CBA) in BPDB?
43. Do you think present CBA is problematic?
44. If yes, what kinds of problem they create?
45. Do you think the present procurement system if defective? Y/N

46. How current procurement policy can be made more effective?
47. If yes, what types of defect are present?
48. Do you know about electricity act and other ordinances?
49. Is coordination regularly in this organization?
50. What are the responsibilities both managers and workers for successful implementation of TQM in BPDB?
51. What are your recommendations for successful TQM program in BPDB?

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**(Signature of the interviewer)**

**Md. Arif Reza Khan**

M.Sc Engineering student, KUET

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**(Signature of the interviewee)**

**(Optional)**

**Note:**

High Skilled :Foreman C&D

Skilled :Electrician grade C, SBA- C

Semi-Skilled :Electrician-A&B, SBA-A&B, Meter reader, Server.

Unskilled : Helper, Labor

## Survey Data Sheet

Prepared for the Project Work for M.Sc. Engineering Degree

Instrument for the Managers

1. Name of the Organization :
- 2.a) Name of the Interviewee :
- b) Designation :
- c) Level of Education :
- d) Age :
3. Category of the Employee :
 

Executive Engg. or equivalent	Sub Divisional Engg. or Euival.	Assistant Engg. or Equivlent
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4. Working Experiences in this job(Years) :
5. Do you have any idea about the existing problem of BPDB? Yes/ No
6. If yes, mention few of them.
7. What is TQM?
8. What are the basic difference between TQM and traditional management?
9. Do you think TQM is a better management system?
10. Do you think TQM is suitable for BPDB?
11. What is Quality control (QC) control circle?
12. Do you know about the number of members in a QC circle?
13. Do you know about the 7 tools of TQM?
14. What is facilitator?
15. In respect of BPDB, which category of employee should be appointed as facilitator?
16. Do you have any idea about steering committee?
17. Do you know the rules of arranging QC circle meeting?
18. Do you know the status of present activities of TQM in BPDB?
19. Do you know about TQM promotion office?
20. Do TQM promotion office monitor TQM activities properly?
21. Do higher authority of BPDB supervises TQM activities?

22. Is there any awareness campaign towards TQM in this organization?
23. Do you have any training on TQM?
24. Is there any depart responsible for training course on TQM?
25. Is present training system suitable for successful TQM program?
26. If not, what kinds of change needed in present training system?
27. What do you think about the main cause of failure of TQM program in BPDB?
  - a. Lack of commitment of the higher authority
  - b. Insufficient knowledge of workers on TQM
  - c. Weak monitoring system
  - d. Negligence of field level workers
  - e. Lack of guide lines to implement TQM
  - f. Adverse culture
28. Do you know about Electricity Act-1910 or other necessary ordinances?
29. What is the name of your department?
30. Is there existing any interdepartmental co-ordination problem?
31. How many employees work in your department?
32. Is PDB is a loosing organization?
33. What are causes of making loss as per your opinion?
34. Do you have any idea on present service rules? Yes/ No
35. Do the employees of BPDB follow the service rules?
36. Do you know about the limitations of present service rules?
37. If yes, what the problems?
38. What is present evaluation system of the performance e of the employee?
39. If present system is defective? Y/N
40. If defective, what are the defects?
41. Is there any labor or workers union (CBA) in BPDB?
42. Do you think present CBA is problematic?
43. If yes, what kinds of problem they create?
44. Do you think the present procurement system if defective? Y/N
45. How current procurement policy can be made more effective?
46. If yes, what types of defect are present?

47. Do you know about electricity act and other ordinances?
48. Is coordination meeting held regularly in this organization?
49. What are the obstacles to implement TQM in BPDB?
50. What are the responsibilities both managers and workers for successful implementation of TQM in BPDB?
51. What are your recommendations for successful TQM program in BPDB?

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**(Signature of the interviewer)**

**Md. Arif Reza Khan**  
M.Sc Engineering student, KUET

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**(Signature of the interviewee)**

**(Optional)**

## Record of consumer growth in last o8 (Eight) years in power sector

Year	System total	% increase over the preceding year
1998-99	1336870	
1999-00	1432817	7.18
2000-01	1542650	7.67
2001-02	1644755	6.62
2002-03	1690451	2.78
2003-04	1794958	6.18
2004-05	1459324	-18.70
2005-06	1518891	4.08



**Installed capacity, Generation, Demand (target), Demand (served) and load shedding  
in MW**

<b>Year</b>	<b>Installed capacity</b>	<b>Generation capability</b>	<b>Demand forecast</b>	<b>Demand served</b>	<b>load shedding in MW</b>
1998-99	3609	2850	2881	2449	774-16
1999-00	3711	2665	3149	2665	536-10
2000-01	4005	3033	3394	3033	663-15
2001-02	4230	3217	3659	3217	367-5
2002-03	4680	3428	3947	3428	468-5
2003-04	4680	3592	4259	3592	694-2
2004-05	4995	3720	4597	3720	770-7
2005-06	5245	3782	4693	3782	1312-15

## Record of system loss in the last years

Year	Distribution loss as % of import	
	With REB	Without REB
1998-99	23.27	30.56
1999-00	20.63	27.73
2000-01	18.77	26.11
2001-02	17.20	24.5
2002-03	14.81	22.35
2003-04	10.90	21.33
2004-05	9.41	20.00
2005-06	8.21	19.06