

A Study of Implementation and Impact of Total Quality Management on Construction Industries: Approach to Small Construction Organization

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ABSTRACT

Today the whole world is being very competitive not only in developed country but also in developing and underdeveloped country. Indian economy is very fast developing economy in whole world. In India, construction industries are playing vital role to develop India. Now a day's in construction industries, not only big but also small construction companies is very competitive and in many companies is trying very hard not only to satisfy their customer's needs but where possible exceed them. This can only be achieved through cost reduction, improvement in Quality, increased customer satisfaction and a constant effort towards world class organizations. In order for companies to survive and grow in the future, it is essential that they deliver high quality construction and services. Those that can deliver quality are the ones that will prosper in the next century. The Indian construction industry as compared with Construction Company of developed countries is being viewed as one with poor quality emphasis compared to other sectors like, the manufacturing and service sectors. Total quality management (TQM) is increasingly being adopted by construction companies as an initiative to solve quality problems in the construction industry and to meet the needs of the customer continuously. TQM has the potential to improve business results, greater customer orientation and satisfaction, worker involvement and fulfillment, team working and better management of workers within companies. However, construction firms have been continually struggling with its implementation. The implementation of a TQM within the organization requires a cultural change and its being recognized as an important aspect of total quality development.

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KEYWORDS: TQM, Small Industries, Management

1. INTRODUCTION

1.1. GENERAL

The whole World talk about the Quality and Quality Construction, but we always neglect the basic concept of Total quality i.e. quality start before we start any new project and still to complete life cycle of the project. When we talk TQM then there are three different words,

Total — Means complete from start to end and made up of the whole,

Quality — Degree of Excellence for service which we provide,

Management — Act and Manner of handling, controlling, directing, planning, etc. regarding the construction project and construction activity,

Today the whole world is being very competitive not only in developed country but also in developing and underdeveloped country. Indian economy is very fast developing economy in whole world. In India, construction industries are playing vital role to develop India. Now a day's in construction industries, not only big but also small construction companies is very competitive and in many companies is trying very hard not only to satisfy their

customer's needs but where possible exceed them. This can only be achieved through cost reduction, improvement in Quality, increased customer satisfaction and a constant effort towards world class organizations. In order for companies to survive and grow in the future, it is essential that they deliver high quality construction and services. Those that can deliver quality are the ones that will prosper in the next century.

The Indian construction industry as compared with Construction Company of developed countries is being viewed as one with poor quality emphasis compared to other sectors like, the manufacturing and service sectors. Total quality management (TQM) is increasingly being adopted by construction companies as an initiative to solve quality problems in the construction industry and to meet the needs of the customer continuously. TQM has the potential to improve business results, greater customer orientation and satisfaction, worker involvement and fulfillment, team working and better management of workers within companies. However, construction firms have been continually struggling with its implementation. The

implementation of a TQM within the organization requires a cultural change and its being recognized as an important aspect of total quality development.

1.2. NEED AND IMPORTANTS OF TQM

The participants in the construction industry tend to be reactive to changes being imposed on them such as economics, political, and technological pressures, which results in poor performance in the industry. TQM can make the organization cope with the change as the norm, rather than being reactive to such pressures of change.

Generally Small Companies competent Customer, Price, Benefits, Quality. If the choice is to compete in the market place on the basis of Customer, Quality and comparative price, then the level of competition is clearly defined; the low-cost provider wins. Whenever companies choosing the low cost approach may find themselves losing quality in to the project as well as low-margin business in the long term but when any small or large organization compromise with quality in their project then definitely they lose their customer and ethic in to the market. This is why many companies have become aware of the need to make quality is the competitive marketing strategy in a global market.

1.3. OBJECTIVE OF THE PROJECT

As per above discussion we say that, there are some problem of Quality not only in final product but also between the process of construction, due to this Quality problem customer is not satisfied. In India the business of construction is more than 50000 cr. and this business is continuously grown up. In construction market there are 50% to 60% shares of small construction organization, so objective of my project is,

1. To study the concept of Total Quality Management [TQM] of construction Project.
2. To conduct the investigation of TQM through case study of construction Company.
3. To analysis the TQM of investigated construction projects and compare study with standard practice.
4. To Suggest a TQM model for implementation in small construction organization and Measure its impact after TQM model implementation.
5. To Suggest/Recommendation and generate Ideas of implementation model of TQM for small construction organization.

2. LITERATURE REVIEW

2.1. TQM VIEWS FROM MANAGEMENT GURUS

In TQM the word "Quality" is very important because through the management of Quality we can achieve the ultimate goal of organization. There are various management gurus write about the Total Quality Management. Before defining TQM we must clear our concept about quality, there are various definitions of quality.

According to International organization for Standard quality management can be defined as follows: All activities of the overall management function that determine the quality policy, objectives and responsibilities, and implement them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system.

Deming was the famous quality guru defined quality as a predictable degree of uniformity and dependability, at low cost and suited to the market.

Crosby (1996) was definition on quality is "conformance to requirements" [20],

Juran (1974) said "quality is fitness for purpose" [13]

"Degree to which a set of inherent characteristics fulfills requirements", -ISO 9000:2000 Quality Management Systems - fundamentals and vocabulary,

Quality is defined as fitness for use and the quality trilogy planning control and improvement, provides a program for quality assurance in organizations.

Total Quality Management includes a number of management practices, philosophies and methods to improve the way an organization does business, makes its new project for construction, and interacts with its employees and customers. TQM is a management philosophy, a continuous improvement approach to doing business through a new management model. The TQM philosophy evolved from the continuous improvement philosophy with a focus on quality as the main dimension of business. Under TQM, emphasizing the quality of the product or service predominates.

G.K. Kanji and M. Asher (2010), TQM is defining as "a continuous process of improvement for individuals, groups of people and whole organizations"[5]

Stein grad, D.S., and Fitzgibbons, D.E. (1993), TQM can be defined as "a set of techniques and procedures used to reduce or eliminate variation from a production process or service-delivery system in order to improve efficiency, reliability, and quality"[6]

As per Vuppalapati, K., Ahire, S.L., and Gupta, T. (1995) "TQM is an integrative philosophy of management for the continuous improvement of product and process quality in order to achieve customer satisfaction" [7]

Evans, J., and Lindsay, W.(1993) say that "TQM is an integrative management concept for continuously improving the quality of goods and services delivered through the participation of all levels and functions of the organization" [8]

Beaumont, N.B., Sohal, A.S., and Terziowski, M. (1997) state that "TQM is an art of managing the whole to achieve excellence"[9]

As per Dean J.W. and Bowen, D.E. (1994), "TQM is a management philosophy or an approach characterized by principles, practices, and techniques. They pointed out three principles that most quality frameworks had in common - customer focus, continuous improvement, and teamwork"[10]

As per the British Quality Association (BQA) have two definitions of total quality management. The first focuses on soft qualitative attributes, containing elements such as customer oriented, cultural as advantage, removal of performance barrier, teamwork, training and involvement of employees while the second definition comprises production aspects such as systematic measuring and control of the work, setting standards for performance and the use of statistical procedures to achieve quantity. This definition focuses, contrary to the first, on hard quantitative attributes.

These are some definition and statement of TQM but without discussion of acknowledging the work of best expert or say

“Guru of Management” Deming, Juran, Feigenbaum, Crosby and Ishikawa we cannot clear our idea of TQM.

Armand V. Feigenbaum (1951) philosophy was focused on comprehensive QC program with a specific focus on the Business Quality. He proposes a 4 step approach for the Quality Control viz., Set Standards, appraise conformance to standard, Act on deviation and constantly improve Standards. He stressed the need for use of statistics for overall administration of Quality. He also broke the quality cost into the constituent elements like the appraisal, prevention and the failure cost. His crucial contribution to Quality management is to create a process of Benchmarking for the Total Quality Management.[14]

Joseph M. Juran (1974) Philosophy was on Improvement orientation. His preaching popularly known as the Quality consisting of Quality planning, Quality Control and Quality improvement had contributed very significantly to the quality management. Dr. Juran’s found the interactions between Quality and various activities in a product lifecycle. He has recommended a Road Map for Quality improvement beginning with the Customer identification ending with the production. Dr. Juran is stated about the Quality circles and Zero Defect movement’s because he strongly believes that 80% of the problems are management controllable. The solution according to him lies in training the top management on Quality to start.[13]

3. CONCEPT OF TQM

This chapter is going to discuss collection of data for this project. Reasons for having such types of collection of data method are presented and explained. The layout of the questionnaire is described as well. Besides, the methods used in this analysis are explained.

First I design a questionnaire for the survey in small construction company. Questionnaire is important to complete the research for this Project. Questionnaire helps to collect the useful information from different people to be used in the analysis of the data. Since questionnaire depends on the decision of recipients and answer which they give on their actual and personal views. In this Project, I was use the five-point **Likert** scale to identify the different answers of different question because the number of scale is suitable and this scale helps recipients make a decision in short time as well as some question is descriptive types so that this question having multiple answer, this helps the respondents to give more answer for their views. Questionnaires survey will be taking with different small construction companies in Maharashtra and construction group to capture their organizational culture profiles and their level of quality practices implementation if they are implemented. Different level management people are included in this survey different opinion to the values of the company. In order to understand the culture profile and QM level of a company in a more comprehensive way, data should be collected from different positions.

In this survey there are two different rounds for collecting data for this Project and Three major category of survey Questioner. The First Round having Two Survey i.e. First and Second Category Survey. The First category is General Survey Category which helps to find the customer satisfaction level for company. This is helping me to identify the customer thinking regarding their company projects and quality of their work. The Second Category is Before TQM Implementation survey. This helps me to identify the actual

level of Quality practices within company as well as company Top and Bottom Management views regarding Quality and also identify to know about TQM implementation barrier. The second round of survey is Third Category type survey.

The Third Category is After TQM Implementation Survey. This is totally base on what I conclude and what I was getting the result with the first round of collection of data from different company. In this project, the definition of organizational culture is the values, beliefs and behaviors that shared within an organization. Thus, when identifying the culture profile of those construction companies, a collectivity of data, in this case ten from each company is used rather than just collecting one individual’s response from each company.

- Personal Interviewing.
- Telephone Interviewing.
- Self-Administered Questionnaires/Surveys.

To complete this part of the questionnaire, the target group is requesting to provide the true information for the company. There will be no right or wrong answers exist for the questions just as there is no right or wrong culture. Each organization is expected to have a different organizational culture. Therefore, when each of the organizations completes the questionnaires, they should truly report the underlying values and assumptions. In these questioners the data which provided by the different peoples in different management levels is highly confidential.

3.1.1. Data Collection Ethics

The following ethics were strictly practiced in the Project:

1. **Informed consent:** -In this area I was gives the choice to Participant to participate or not to participate, and furthermore be informed in advance about the nature of the Project.
2. **Right to privacy:** -The nature and quality of participants’ performance must be kept strictly confidential if they want.
3. **Honesty with professional colleagues:** -Findings must be reported in a complete and honest fashion, without misrepresenting what has been done or intentionally misleading others as to the nature of it. Data may not be fabricated to support a particular conclusion.
4. **Confidentiality/Anonymity:** -It is good to Project practice to offer confidentiality or anonymity, as this will lead to participants giving more open and honest responses.

4. ANALYSIS OF SURVEY

4.1. INTRODUCTION

Data analysis is “the process of bringing order, structure and meaning to the mass of collected data” [29]. An analysis of the firm’s organizational characteristics and the respondents’ demographic characteristics is reported in this section. The purpose of this analysis is to give a clearer picture of the background of the companies and the respondents involved in this study.

In this chapter I will analyze the results of the First round Survey i.e. first category survey i.e. General Survey Category and Second Category Survey i.e. Before TQM implementation category Survey Which I conduct in different small construction company in Maharashtra like Pune, Nagpur, Jalgaon, Bhusawal etc. in randomly. For data analysis I used computer software of MS-EXCEL 2007 Version on Windows- XP Operating System.

4.1.1. Analysis of Result for Customer Satisfaction Survey (General Survey Category)

In this questionnaire, six questions designed to find the satisfaction level of customer regarding their company, services and surveyed 05 Customers in one Project of the company and only 34 companies' responded to the survey.

Q.1 What you think about Company?

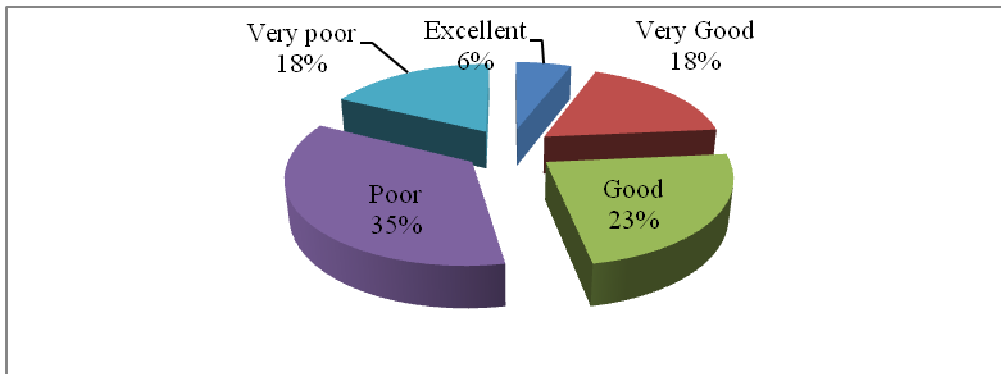


Figure No.4.1 Thinking of Customer

Q.2 Company provided all information regarding the Quality Standards for your Project?

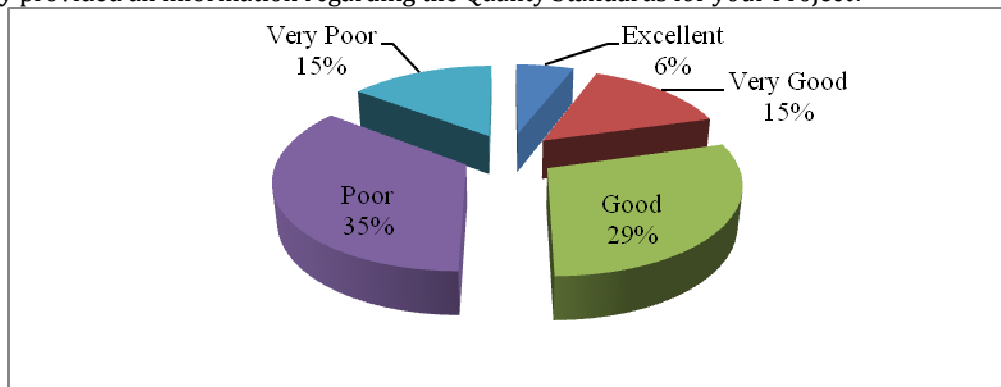


Figure No.4.2 Information Regarding Quality Standards

Q.3 Your Company is Quality oriented?

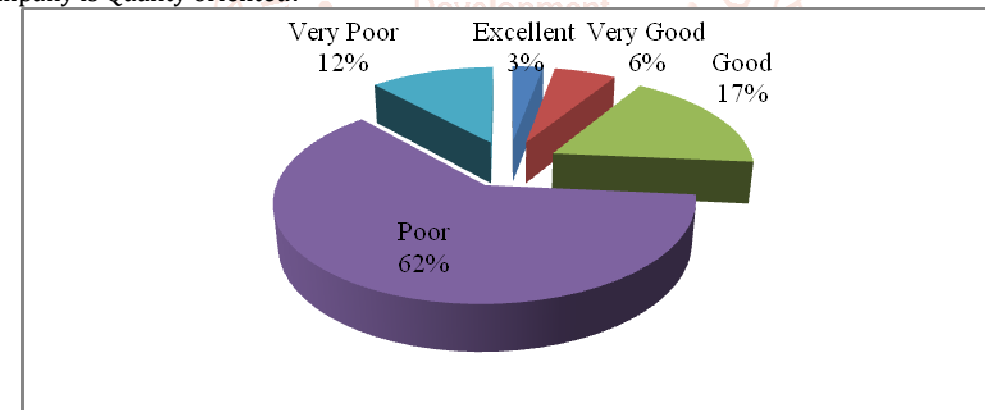


Figure No.4.3 Information for Quality Orientation

Q.4 The Company has effective policies to support improving the quality of Work and Services?

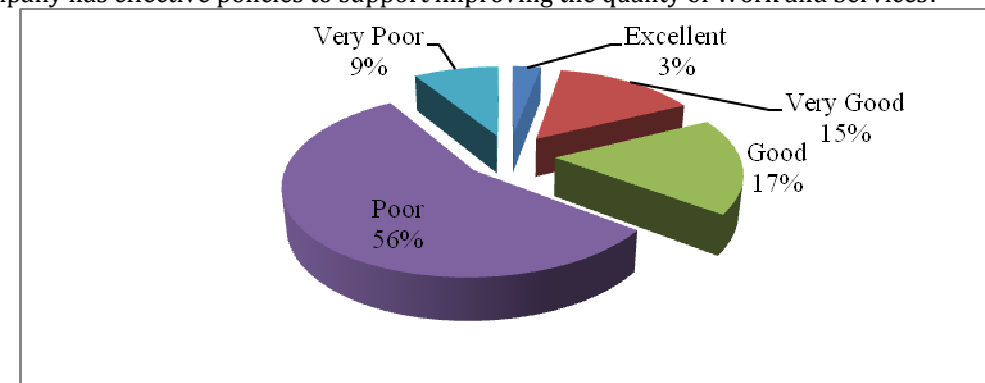


Figure No.4.4 Information for Quality Work and Services

Q.5 What you think about the company services during the Project?

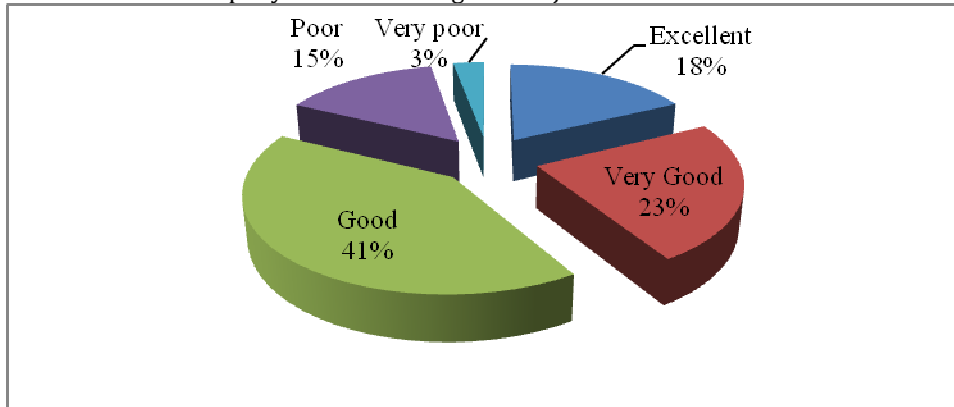


Figure No.4.5 Information for Company Services During Project

4.2. SUMMARY

In this chapter with the help of MS-EXCEL software, I analyzed all questionnaires data which I collect from customers, Top Managements and Bottom Managements of different Small Construction Company. I realize that current customer of Construction Company is not satisfied with company services. Also company is not customer oriented or no attachment with customer after maintenance period is off. Top management is not a Quality oriented, as well as they think that, marketing is a way to increase sales nor Quality.

Top Management is not providing any Training and Education to employees. There is contrast between Top and Bottom Management opinions on Quality issues. In companies there is communication gap between Top Management and Customers is occurred.

Big construction companies already start to practices with TQM and enjoy the result of TQM, but Small construction company still not a quality conscious and customer oriented. Most of the Top and Bottom management is not participate in this survey because of TQM threats and they are satisfied with traditional practices.

5. IMPLEMENTATION AND IMPACT OF TQM MODEL

5.1. INTRODUCTION

This chapter presents the development of a TQM implementation model for small construction companies. The development of this model was based on the TQM literature review, the structured interviews in small construction company, the questionnaire findings from Top and Bottom Management, Customer Survey i.e. Overall first round survey result, and the general characteristics Small construction companies. In construction and implementation stage it is essential to implement TQM for controlling the process and reduce defects, rework, time, cost, and increase the quality of the product to meet the customer satisfaction.

As per the result of round first i.e. General survey and Before TQM implementation survey, I am finding that small construction company is not properly oriented to Customer satisfaction, but they want to achieve maximum profit rather than quality. I also notice that small construction company is not strictly check quality on each step of the construction actives. They also not have any kind of Quality manuals like Big Construction Company. There is no quality department between the companies. So that most of the time quality

works ignore by the site staff. Also Top Management is ignoring quality works sometime as well as they are not interacting with customer after project completion. Small construction companies' Top management is not so interact with customer.

5.1.1. Barrier of TQM Implementation

As per the result of round first I conclude that following are the barrier of TQM implements as per Top and Bottom Management which is listed below,

1. Lack of management commitment.
2. Lack of quality Audit within construction operation.
3. Misunderstanding about the concept of TQM.
4. Lack of employee commitment
5. Lack of effective communication.
6. Lack of continuous training and education.
7. Inadequate use of empowerment and teamwork.
8. Inadequate attention to internal and external customer.
9. Delay or no implementation of quality improvement teams recommendation.
10. With the help of all these points I am just make a small model of TQM

5.2. TQM MODEL FOR SMALL CONSTRUCTION COMPANY

This model is like a combination of Matrix and Staffing model. In this new TQM model which I produce, I strongly recommend the strong Quality Department within the company and Top management must provide basic knowledge and training about the Quality to every worker, so that the confidence and ethic built in worker mind. One side of this model is strictly indicate that there must be quality audit must be perform by Quality Department with all work. The Supervisory work, Subcontractor work, Middle management work, and Top management work must check by quality department. There is one suggestion, if any company not having any quality department; they can perform this kind of work with external agency. Another side of this model is Supervisory work, Subcontractor work, Middle management, and Top management. In this side all work is supervisee by superior department.

In this model, I give high preference to Customer. I also suggest that Top management must communicate with Customer and gives all information regarding all quality audit report to Customer. This helps to develop ethics and good relation between Top management and customer regarding company and companies polices.

**5.2.1. Top Management Quality Base Survey (After TQM Implementation Category)
TQM Questionnaire Survey**

Company Information

Name of the company: _____

Nature of company (general contractor/prime contractor/other): _____

Position of respondent in the company: _____

1. Now are you known about TQM?

- Yes
- No
- Did not answer

2. Is formal training in TQM or other quality improvement philosophies given to employees?

- Yes
- No
- Did not answer

3. Percentage of managerial / supervisory staff who has undergoes quality Improvement Training.

- who have under gone training-
- who did not have undergone training-
- Did not answer

4. After the implementation of TQM improvement program, service / product quality has,

- Improved
- Can't say
- Did not answer

5. After the implementation of TQM improvement program, relationship with your customers and suppliers has,

- Improved
- Remained the same
- Can't say
- Did not answer

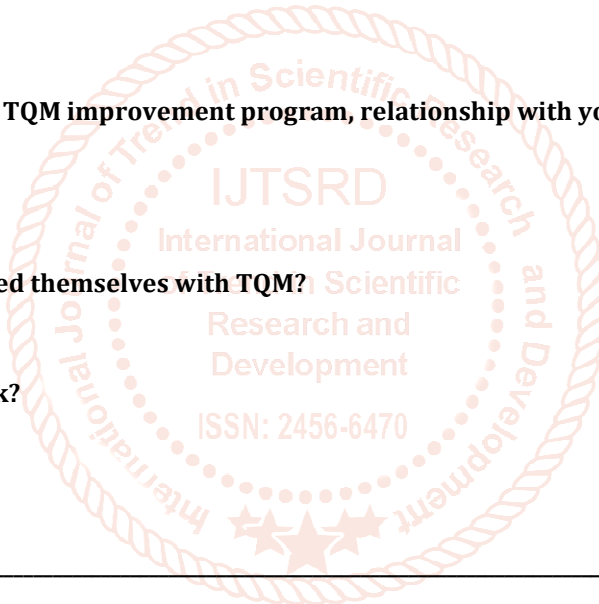
6. Has your employee developed themselves with TQM?

- Yes
- No

7. This TQM model really Work?

- Yes
- No
- Not Answer

8. Any Suggestion



**Seal and Sign of Respondent
(Optional)**

5.3. SUMMARY

The model which is presented in this chapter is totally based on result of questionnaires survey of Round First. The main barrier of Implementation of TQM model is, Threat of TQM, Less or No knowledge of TQM, Lack of Quality audit etc. On overcoming all barriers a new TQM implementation model is generated here and recommend to all small Company who participated in survey. After 45 days with the help of questionnaire collect the data from participated company and only 6 companies try this model, due to this model their wastage is minimized by 5 to 20% and Profit of Company also increase as well as communication with customer and suppliers increase with customer satisfaction and customer belief.

6. DISCUSSION AND CONCLUSIONS

6.1. DISCUSSION

After the literature reviews, study of different research papers, quality theory and survey which I conduct with Customer, Top Management, Bottom Management of Small Construction Company as well as the result of this Project survey work, I suggest following points to Small Construction Companies. This is also useful for Large Construction Companies.

Following are the Discussions and Suggestions for companies are,

1. Fixed and Clear the Aims and Purpose of the Organization, with proper path to achieve them i.e. to make our company small for Localities Company or Globalize Company.
2. Top management shows total commitment and is seen to be "walking the talk", then the employees will soon follow their example i.e. Top management always takes leadership regarding best Quality practices within company.
3. I strongly recommend and suggest, applying 'Do It Right First Time' and 'Zero defects', concepts within company, so that wastage is minimized and profit maximize.

4. Internal quality audit has the highest degree of usefulness to maintain and proper check on quality of work. It was followed by Production planning and control and Problems solving technique.
 5. In small construction company, they must introduce Quality department in their organization chart. If this is not possible then, Third party quality audit must to maintain quality standard.
 6. Top management must get involved for superior customer service must start with the top management of the organization being committed to the process of satisfying and meeting the customer's expectations, as well as develop ways to enhance the relationships with current and potential customers and provide a means to measure and evaluate satisfaction.
 7. Provide basic Training and Education to employees and suppliers and help them in recognizing suggestion opportunities, and making suggestions.
 8. Improve communication between management and employees to ensure a better understanding of the company objective
 9. Incentives, either monetary or otherwise by job guarantees and forms of appreciation should be given to the construction team for successfully performing the work in accordance to the TQM requirements. This will encourage them to continuously implement the TQM. All benefits that the company gained during the implementation of the TQM should be publicized to dispel the fear and misunderstanding of other companies on the implementation of the TQM.
 10. I strongly recommend to all Small Construction Company that they must try new "A" shape model. So they can achieve maximum customer satisfaction with high quality standard.
 11. Small Construction Companies also practices with different ERP software's, so that they can also enjoy high Quality standards with check and this is first step to ahead from Small to Big Organization.
 12. Small Construction Companies must try to achieve Quality Certificates like ISO.
 13. Government is recommended to construct a new Rules and Regulations to all Construction Companies regarding quality practices, so that they follows Quality standards and Customer is getting full advantage of their money.
 14. Construction Companies must follow PDCA cycle to achieve Total Quality Management.
3. A 75% step of ISO 9000-2008 is having same as TQM but TQM is more than ISO because TQM contain aim of the organization also between their implementation.
 4. For data collection Questioner method is suitable for clearing concept of TQM. For making of Quality manual management responsibility, Quality standards, audits, Training Programs etc.
 5. In Big Construction Company Quality polices regarding Materials, Procedure, Customer is already decided by Top Management.
 6. Total quality management (TQM) is increasingly being adopted by construction companies as an initiative to solve quality problems in the construction industry and to meet the needs of the customer continuously.
 7. Lack of Top Management commitment many of the Small Construction Companies is shut down.
 8. Most of the Small construction Company does not participate in survey. This action is shows that they are feared regarding to change and they don't want to change themselves.
 9. There is contrast is occurred between Top & Bottom Management views regarding Quality Practices as well as customer satisfaction level.
 10. Most of the Top Management is not having any awareness about quality work.
 11. From data analysis, No any award system is follows by Small Construction Companies like Big Construction Company to encourage the employee for performing Qualitative work.
 12. There is big communication gap between Top Management and Customer is showing by data analysis of survey.
 13. One good thing is, most of the Small Construction Companies owner is positively response to change but there is time required to change.
 14. Proposed New model is small and very useful to Small Construction Company, due to this model wastage is reduce, Profit increase & good relation maintain with Customers.
 15. The results of the study clearly indicate that continuous improvement is the most critical factor for the successful implementation of TQM.

6.2. CONCLUSIONS

There is no universal, cookbook approach to implementing TQM. Before implementation small construction company should realize that, if they provide quality product to their customer then their customer is make advertisement for their product, so there is no need to spend money for marketing & they can easily use this fund for overall growth of satisfaction level of employee & customer.

1. Quality starts before we start any new project & still to complete life cycle of the project.
2. All philosophy & theory of TQM gives the priority for overall customer satisfaction.

Total Quality Management implementation however indicate that a Construction organizations should realize that results cannot be gained overnight and that an organization needs time to adapt, change, and learn. Nevertheless, the foundation of experiences presented in this paper remains valid and should be helpful to small construction companies making new starts at TQM or those wishing to make modifications to their on-going TQM implementation efforts.

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