

# IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT (TQM) IN CONSTRUCTION-A REVIEW

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## ABSTRACT

Total quality management (TQM) is a management philosophy widely implemented in the manufacturing and other service industries and has proved to improve the quality in these fields. With its primary focus being the involvement of everyone, TQM has the ability to improve economy of an organization, greater customer satisfaction, worker involvement and better management of workers within the companies. TQM's ability to adapt new ideas, tools and methods suggest that it can be applied in construction industry also. The objective of this paper is to review the latest studies which focused on increasing quality through implementing TQM in construction industry and its suitable applications in the different phases of project construction.

**Keyword:** - TQM, customer satisfaction, management commitment, paperwork, worker participation

## 1. INTRODUCTION

Quality is one of the important aspects of a successful construction project. To be competitive in today's market, it is essential for construction companies to provide more consistent quality and value to their owners/customers.

Now is the time to place behind the old adversarial approach in managing construction work. It is the time to develop better relationships with customers, provide customer satisfaction, initiate more teamwork at the job site, and to produce better quality work. Such goals demand establishing a continuous improvement (CI) process within the company in order to provide quality management. Recently Total Quality Management (TQM) has been proved to be the most successful continuous improvement system.

Total quality management (TQM) process has been considered as a modern system in the field of quality, after quality assurance, quality control and ISO in the Construction sector. Recently many organizations have started implementing total quality management, with a view to assessing the level of quality and to improve it.

The basic concept of TQM was developed by the three famous quality gurus- Deming, Juran and Feigenbaum in Japan(1940).The term 'total quality' was used by Feigenbaum at the first international conference on quality control in Tokyo (1969). Finally in the 1980s-1990s, a new phase of quality control and management began. This became known as Total Quality Management (TQM).

It was a customer-oriented, quality focused management system for continuous improvement. It proved to be a great success in obtaining good quality products. Although it was initially implemented in the manufacturing and automobile industries in Japan, later it was adopted by the construction sector. Although it was initially implemented in the manufacturing and automobile industries in Japan, later it was adopted by the construction sector.

## 2. LITERATURE REVIEW

Few articles and studies attempted to bring the benefits of TQM philosophy to construction industry and they are listed below. Researchers found that irrespective of certain limitations in its implementation TQM can be a very effective quality management system.

### 2.1 TQM and its Implementation

Tarak Elghamrawy Tomoya Shibayama (2008) [7] The study recognizes TQM as a successful philosophy which can be implemented in the construction Industries in Egypt. A comparison of management system is made between a Japanese company working in Egypt with the Egyptian company, to demonstrate how TQM can be implemented effectively in the Egyptian construction industry. Based on the research, the paper presents the following: i. The Characteristics of the Egyptian Construction industries. ii. Issues in Application of TQM in Construction industries. iii. Some features of the Japanese construction industry which could be applied in the Egypt. iv. Proposed a new model for TQM implementation which is suitable to Egyptian construction industries. New Model proposed to implement TQM through the following steps: 1.) Commitment by Top Management 2.) Orientation 3.) Planning of the Program 4.) Training on the TQM 5.) Conducting the Quality Projects 6.) Improving Job site quality

Rizwan U. F., Sarosh H. Lodi, S.F.A. Rafeeqi, K. P (2010)[2] in their study they aimed how to implement TQM to Pakistani construction industry. After analysis and statistical sorting of data based on field surveys through questionnaires and one-to-one interviews with various construction practitioners.. Implementing TQM requires a major organizational change that would transform the culture, process, strategic priorities and belief of an organization. Apart from commitment top management must educate its employees on the need of TQM so that it will help to reduce the amount of work for employees if they no longer need to attend the customer complaints and defect problems. In the research by outlined the following basic framework for implementing TQM in construction firms namely: customer feedback system, continuous improvement, encourage teamwork, reduce number of suppliers, process management and improvement through productivity study, effective communication system, top management, review organizational culture, produce training plans and establish monitoring process. This paper indicated the importance of TQM implementation followed by continuous improvement, top management role, customer focus, and teamwork; and effort commitment is the most factor of organizational commitment.

Raji Al-Ani and Firas I. Al-Adhmawi (2012) [5] stated that reviewing literature pertinent to quality management concepts and its application in construction industry has formulated the definition of "Quality Management" as meeting the owner's requirements or compliance with the set standards and specifications. This definition can be realized through the application of quality management concepts which are represented by "Total Quality Management" TQM as a higher management level which has been achieved by quality management works.. In turn, such management can be attained by a specialized management field named "Quality Management". The researchers have recommended a proposed Quality Management System for Construction Site aiming: firstly to raise the quality level of works in construction projects, and secondly to improve the construction staff consciousness, in different managerial levels, about quality management concepts and its importance for improving the quality of construction works. The researchers have come out with certain conclusions, above all is that this proposed quality management system for construction site will improve conducting quality management concepts in achieving construction works by construction companies.

D. Arditi and H. Hurat (2000) published a paper in which they dealt with a Total Quality Management programme in the construction process. This research explains the main elements of total quality management in construction industry. The main elements of TQM that are still applicable and essential to the implementation of a successful quality system in construction organizations are leadership and management commitment, training, communication, teamwork, customer satisfaction, continuous improvement, process improvement, supplier involvement, focus on employee.

### 2.2 Effects of Implementing TQM in Sites

The effects of TQM on project performance were studied by Nashwan Mohammed, NomanSaeed and Awad Sad Hasan (2012)[1]. In their research TQM framework developed according to literature review. This framework

demonstrated the relationship between TQM and construction project performance by examining the effects of 9 TQM constructs on three element levels of project performance. The proposed model and hypothesis were tested by using data collected from construction firms in Yemen. The survey covered 40 companies chosen from construction sector and 29 questionnaires were returned. The response rate was 72.5 %, normal for such research. The results from this survey support the proposed hypothesis that TQM has positive effects on teamwork satisfaction, quality of construction project implementation, client satisfaction, and construction project performance. Finally, this research concludes with a TQM process for improving construction project performance, a discussion and the general conclusions made with reference to the survey findings. The results provided useful information for the development of a suitable TQM framework for the construction firms.

Ahmed S. A (2010)[3] in his paper pointed out how construction professionals implement TQM and its tools in their projects in the different stages of construction. From the results and conclusions from each case study included in this paper, it's clearly known that TQM can improve business quality, increase customer satisfaction, reduce cost, save time and much more. The reason that the construction industry has arrived late to TQM is that the construction professionals are unaware of the TQM principles and techniques. To bring these benefits to the construction industry, more efforts must be made to spread the culture of TQM among the construction professionals and TQM courses must be in the engineering under graduated programs.

Abu Hassan Bin Abu Bakar, Khalid Bin Ali and EziakuOnyeizu (2011) [7] in their paper aimed to identify the level of effectiveness of the implementation of TQM principles by the construction contractors in the Sultanate of Oman in the top grade construction company as per classified by the Chamber of Commerce and Industry of Oman. Important factors were taken into account relating to the internal customers (the staff) of these companies. A quantitative research approach was adopted in this study, where the questionnaires were distributed to 114 top staff of excellent and one grade contractors to identify the level of quality practices in their organizations and ascertain that they follow the rules of total quality management or not. For analysing purpose, chi square test, frequencies and response rate are used in this paper. They found that companies generally take into account the principles of total quality management.

### 2.3 Limitations in Implementing TQM

Pheng and Teo(2004)[6] stated many hindrance factors that hold back contractors from implementing TQM in construction sites. They said that contractors did not contest the correctness or the validity of TQM principles, tools, or methods. They were apprehensive about the effectiveness of the quality management program in an environment that did not have a standard scale to measure relative value and quality. In their study they supported this, listing the primary reasons for contractor resistance as:

- The difficulty in applying TQM principles in an industry with high product diversity by using subjective numbers to define quality (i.e., meeting the customers' needs and providing high client satisfaction);
- The difficulty in successfully integrating TQM in a company and maintaining stability and competitiveness in industry.
- The low cost-benefit ratio of improving quality in the construction industry and, specifically, of implementing TQM in construction.

Rizwan U. F., Sarosh H. Lodi, S.F.A. Rafeeqi, K. P (2010)[2] in their study that fragmented nature of the industry is a barrier in TQM application. Contractors are reluctant in adopting TQM philosophy as they have a myopic view and are unable to realize its long term benefit.

### 2.4 Solution to the Hindrance factors

Tang, W, Qiang. M, Duffield, C., Young, D., and Lu, Y. (2009)[9] This paper focus on increasing trend of TQM in Construction Industry with the key TQM factors. The study states partnering as a solution to all the barriers and a way to effective implementation. Partnering brings the various stakeholders to form a united multifunctional project team to improve quality. The Win – Win approach by partnering is by sharing the reward among the members to

boost the performance. The data was collected through triangulated questionnaire survey method, Interview and Case study involving the Chinese construction industries. The study reveals a strong Positive correlation between Partnering, use of incentive and TQM.

Ahmed Tholhath (2016) [8] in his research he suggested BIM can increase construction productivity and prefabrication with less rework on site. Incorporating TQM concepts with innovative planning to improve construction implementation was focused in this study. This study brings out that the construction industry needs to integrate TQM and BIM for the successful implementation of construction projects towards sustainable buildings.

### 3. CONCLUSIONS

Total quality management or TQM is a management philosophy which focuses on involvement of everyone and focuses on achieving customer satisfaction. Various researches found the impact of TQM and shows that TQM has positive effects on teamwork satisfaction, quality of construction project implementation, client satisfaction, and construction project performance. Studies also show that TQM is not a fad and how much benefits that TQM can bring to construction sector (Improve business quality, increase customer satisfaction, reduce cost, save time and much more). Previous studies have been successful in proposing a new model to implement TQM through the following steps: 1.) Commitment by Top Management 2.) Orientation 3. ) Planning of the Program 4). Training on the TQM 5.) Conducting the Quality Projects 6.) Improving Job site quality. But the TQM has arrived late to the construction industry as the construction professionals are unaware of the TQM principles and techniques. To bring the benefits of TQM to the construction industry, more efforts must be made to spread the concepts of TQM among the construction professionals. Researchers identified various hindrance factors for implementing TQM in construction stating the fragmented nature of the industry as the most important limitation. Studies have also done in finding solution for the limitations and brings out that partnering and BIM integrated models can successfully implement TQM in construction Industry.

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