

# Adoption and implementation of Total Quality Management in construction industry

<sup>1</sup>Sapna V. Upadhyay, <sup>2</sup>Shakil S. Malek

<sup>1</sup>Student, <sup>2</sup>I/C Principal

<sup>1</sup>Post-Graduation in Construction Project Management

**Abstract** - Total quality management (TQM) is a management philosophy which has been mostly used in the manufacturing and other services industries, and it shows how significant it can improve the quality in these fields. Few articles, studies, and researches attempted to bring the benefits of this philosophy to construction industry. The objective of this paper is to point out the latest studies which focused on increase the business quality through implementing TQM in construction industry and its suitable applications in the different phases of project construction. In this paper it has shown that how customer satisfaction can be increased by using appropriate TQM plan. In the same way TQM can be implement for continuous improvement in any phase of project construction.

**Index Terms** - TQM Plan, Continuous Improvement, Construction Industry, Beneficial, Customer Satisfaction

## I. INTRODUCTION

The primary purpose of TQM is to provide excellence in customer satisfaction through continuous improvement of products and processes by the total involvement and dedication of each individual who is in any way, a part of that product or process (Ahmed 1993). The principles of TQM create the foundation for developing an organization's system for planning, controlling and improving quality (Deming 1993). TQM is a structured approach to improvement. If correctly applied, it will assist a construction company in improving its performance. It involves a strong commitment to two guiding principles: customer satisfaction and continuous improvement. In a study of customer satisfaction factors for clients of the transportation, food, chemical and paper, utilities and other miscellaneous industries it was found that timeliness, cost, quality, client orientation, communication skills, and response to complaints were most significant (Ahmed and Kangari 1995). Another study suggests that TQM methodology like equal function deployment (QFD), provide a structured framework for continuous improvement and customer satisfaction (Ahmed and Kangari 1996).

## II. NEED OF THE STUDY

TQM places emphasis on prevention, not correction. The goal is work that is 100% free of errors, free of accidents, and free of waste. The name of the game is to do things right on the first time, eliminating waste and rework. To do this, it is necessary to focus on "processes." Basically, a process is a task or a series of tasks. A process might be the vibration of fresh concrete, the fabrication of structural concrete, the preparation of a shop drawing, or a way in which the project manager deals with a client and with other members of the team (AGC 1993). Though all above knowledge it is found that there is a mind set in the construction industry that TQM is only useful or helpful in manufacturing industry and it cannot be helpful in construction industry.

## III. OBJECTIVES

Specifically, the aims and the objectives of this research project are to:

1. To investigate the adoption and implementation of TQM (Total Quality Management) in construction industry.
2. To determine the processes that are the most suitable and appropriate for measurement during the construction project life-cycle and;
3. To develop a model for the measurement and evaluation of the quality performance of the construction process identified in (2) above as a tool for continuous improvement.

## IV. SCOPE OF THE STUDY

This research proposes to investigate the adoption and implementation of TQM in the construction industry and develop a "measurement methodology" of construction processes for customer satisfaction and continuous improvement. The main purpose of this research project is to identify the construction process that can be measured and develop a model to measure them.

## V. RESEARCH METHODOLOGY

It discusses the methodology utilized to conduct this research study. The data for this research was collected through the use of questionnaires targeting contractors, Builders, engineers and clients in Ahmedabad. The main objective as stated earlier is to

demonstration how a system can be developed for the continuous improvement of goods and services for optimal customer satisfaction.

When it comes to measuring work process, the construction industry does not enjoy a good reputation. The problem, however, can be attributed to the nature of the industry, which lacks solid data gathering and the exceptional fluctuation in productivity. Data collected in a construction project usually lacks consistency in structure and compilation (choi & Ibbs 1994). Those attempting to measure the performances of construction operations are bound to face difficulties such as incomplete or non-existent data. Unlike manufacturing (and service industry where TQM has been successfully adopted and implemented), the temporary nature of construction projects provides little incentive for structured data gathering and analysis. This in turn is bound to have a significant impact on the actual measurement process.

Questionnaires were developed to elicit information about the quality management practices in their businesses. The first questionnaire was divided into six parts namely: their knowledge of TQM, their perception of quality, the data acquisition methods used by them, the degree of training provided to their employees towards TQM, and the obstacles faced by them in implementing TQM in their businesses. Second questionnaire called the client satisfaction index was developed and was given to several clients and owners to get their feedback on the areas of dissatisfaction by conducting personal interviews with them. And third questionnaire developed using TQM tool called the Fishbone Diagram or the Cause-and-Effect Diagram, was sent to several contractors and subcontractors to identify the important sub causes.

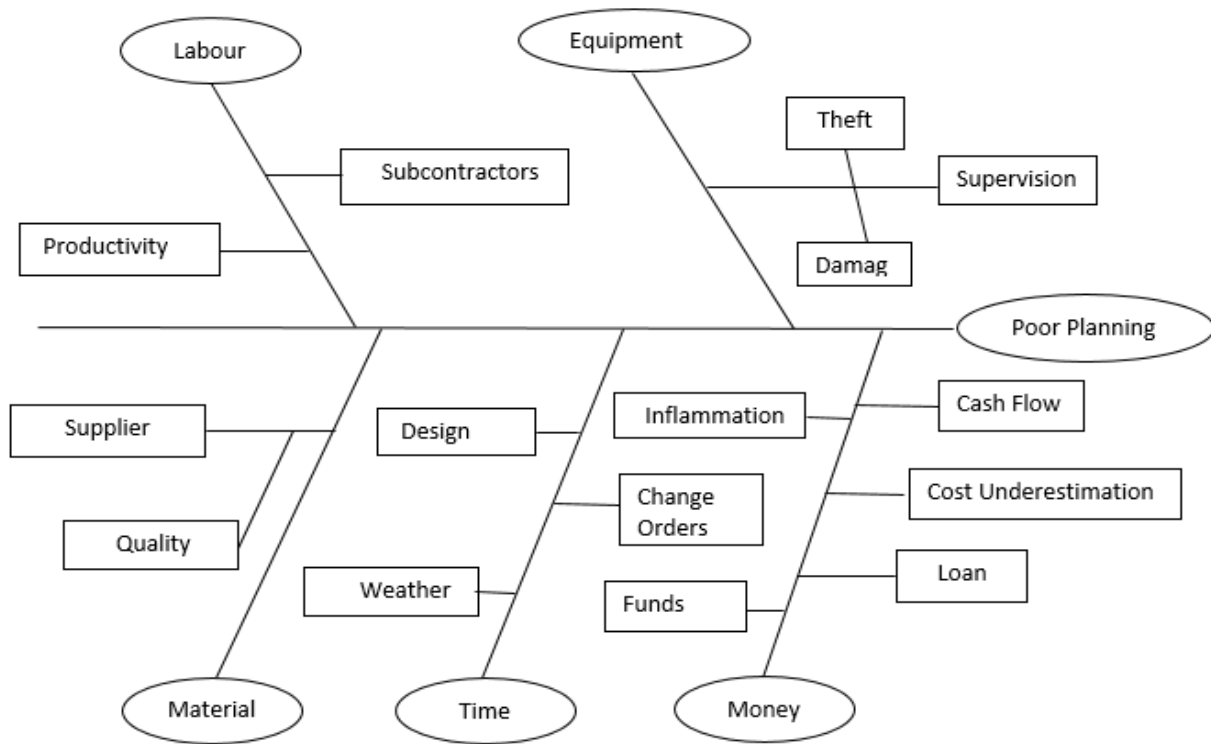
**VI. DATA COLLECTION AND ANALYSIS**

The following tables are the results gathered from Questionnaire #1. Adoption and Implementation of TQM in the construction industry, which is composed of 36 questions and divided in six sections as follows:

- Knowledge of TQM
- Your perception of quality
- Data acquisition method
- Quality in your organization
- Training
- Others

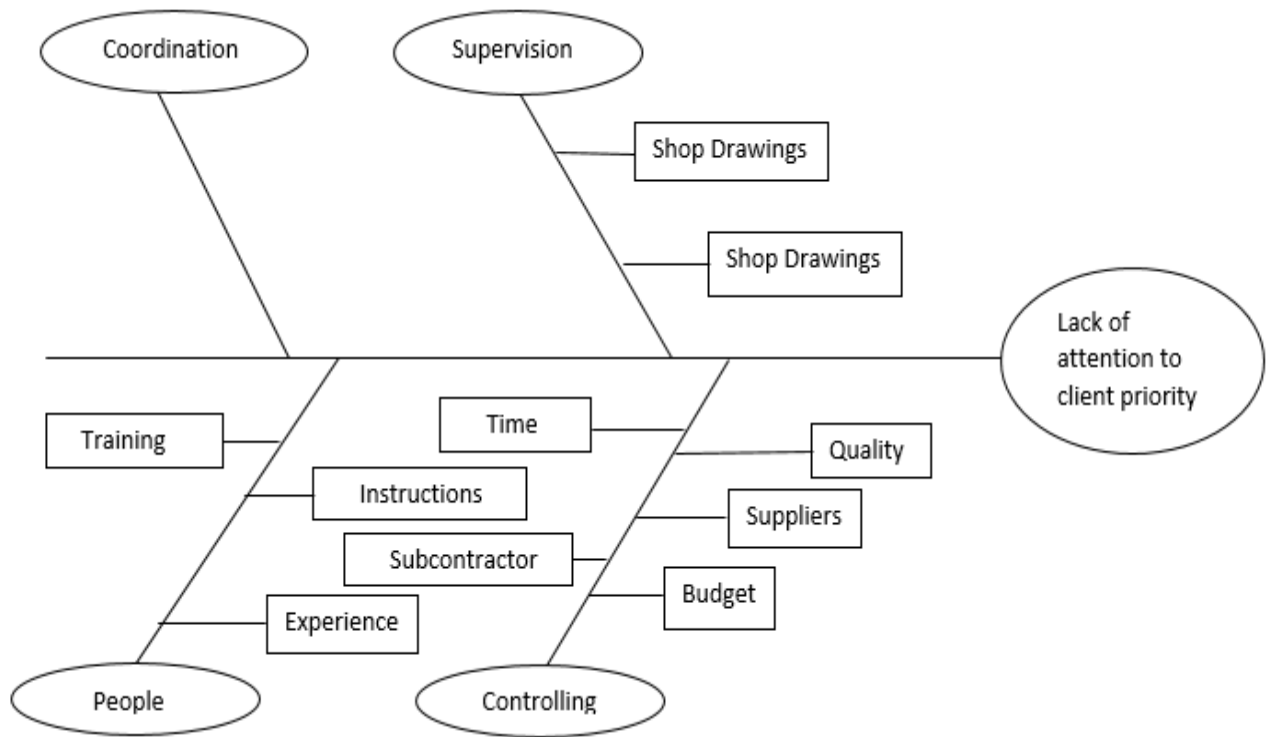
From Questionnaire #2 Client satisfaction index, sub-causes of the problems that causes client dissatisfaction is known and it is represented in the form of the fishbone Diagrams.

1. Poor Planning



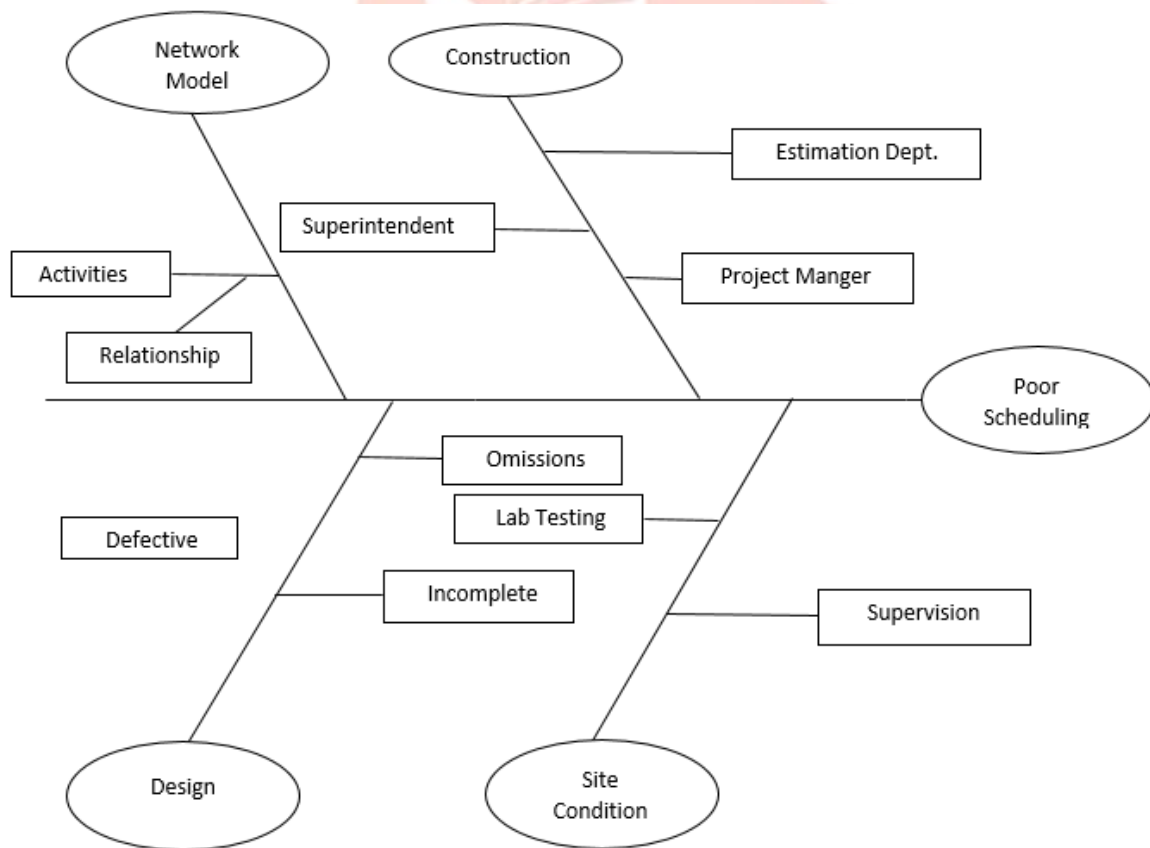
**Fig-1** Fishbone Diagram: Sub-causes of Poor Planning

2. Lack of Attention to Client Priority



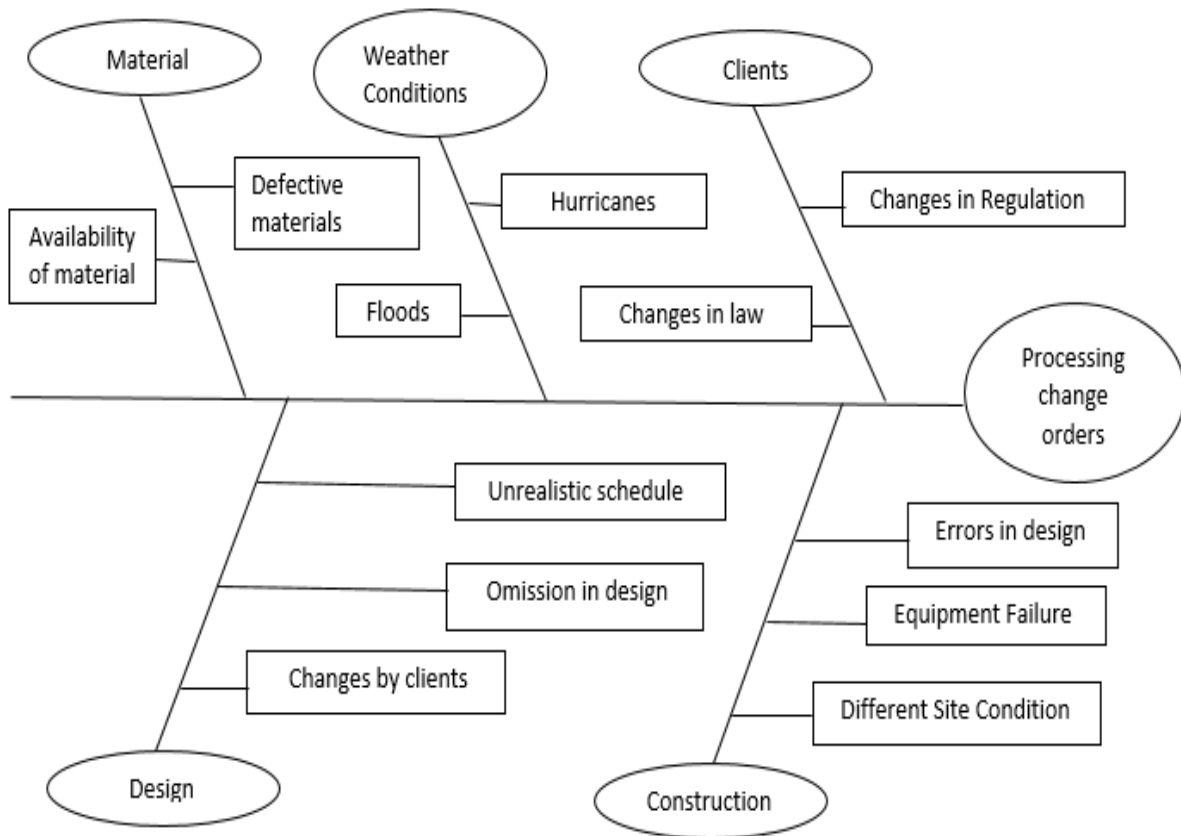
**Fig-2** Fishbone Diagram: Sub-causes of Lack of Attention to the Client Priority

3. Poor Scheduling



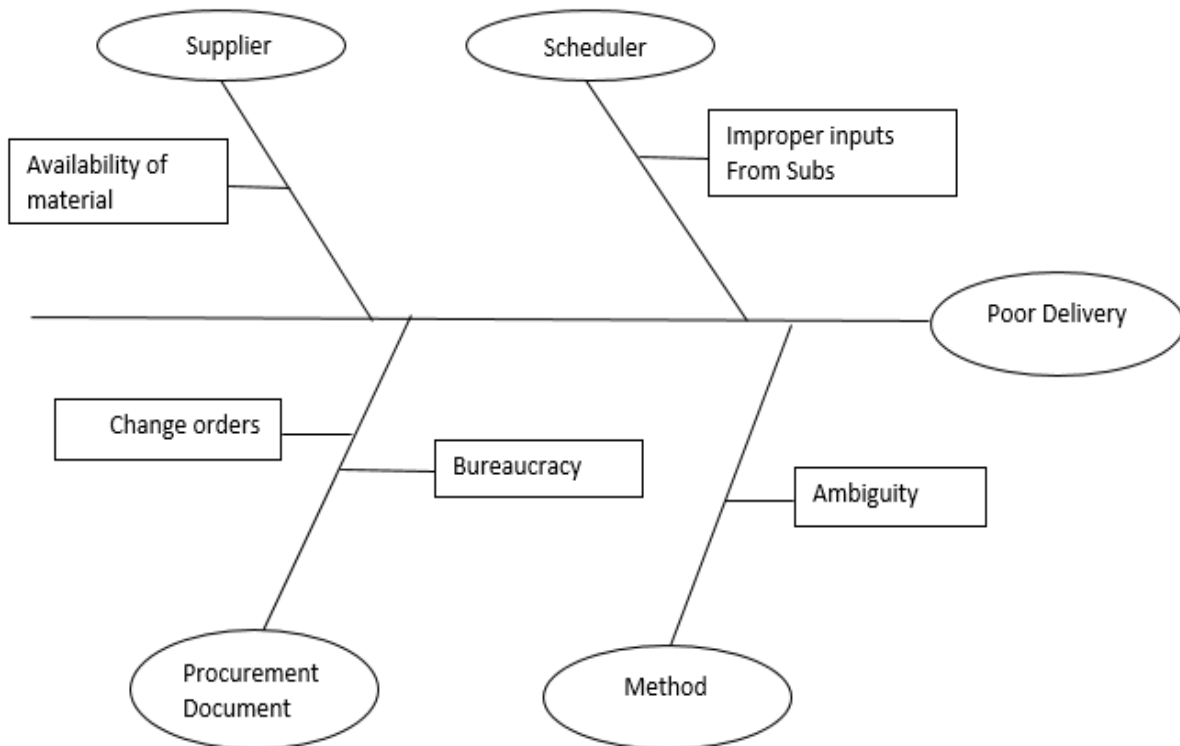
**Fig-3** Fishbone Diagram: Sub-causes of Poor Scheduling

4. Processing Change Order



**Fig-4** Fishbone Diagram: Sub-causes of Processing Change Orders

5. Poor Delivery



**Fig-5** Fishbone Diagram: Sub-causes of Poor Delivery

All the above Fishbone Diagrams represent the sub-causes for the problems faced by the clients and they are dissatisfied in the following areas.

## VII. CONCLUSION

It is easy to infer from the above that although 'Total Quality Management' has been a magic word in the construction industry for the past few years, methods and techniques to implement the Quality Management Program in the industry are still to be developed. The basic problem attribute to a lack of expertise or resources for implementing quality improvement programs is the difficulty in assessing what to measure and how to measure them- particularly the intangible aspects of quality. Without measurement, the notion of continuous improvement is hard to follow. Customer satisfaction can be greatly enhanced by improving construction underestimation, conformance to specification, project management coordination, design changes by clients and change orders from procurement department.

## REFERENCES

- [1] Shakil .S. Malik, "Risk Management in Indian (Gujarat) Real Estate – Lesson from China
- [2] Total quality management – Aspects of implementation and performance
- [3] Juran J.M. 1988, Juran's Quality Control Handbook, McGraw-Hill Book Co. Inc. New York
- [4] Deming (1968), "The PDCA (Plan-Do-Check-Act) Diagram"
- [5] Austin (1992), "Implementing Total Quality Management in Engineering and Construction Industry.
- [6] Adrian, J.J. (1995), Total quality management, The Illinois Department of Transportation
- [7] Ahmadinejad M., Keymanesh M. Ayoubinejad J, Maghrebi M. (2006), "The Survey of Implementing Quality Management System in Iran Construction Industry", International Civil Engineering Conference "Towards Sustainable Civil Engineering Practice" Surabaya
- [8] Anand, K.N. (1999) "Changing Phases of Quality Department: An Indian experience", Total Quality Management & Business Excellence

