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A Survey on Total Quality Management in the Civil Engineering

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ABSTRACT

Now days, the best quality, time and cost are the important aspects of successful construction project which fulfils the main goal of construction industry. The quality management has to provide the environment within which related tools, techniques and procedures can be deployed effectively leading to operational success for a construction project. The role of quality management for a construction company is not an isolated activity, but intertwined with all the operational and managerial processes of the construction project. The quality management system in construction industry refers to quality planning, quality assurance and quality control. The paper includes the outcome of the research methodology decided by authors based on interview of project participants and analysis of scrutinized interview data.

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I. INTRODUCTION

The work of Consulting Engineering Companies involves a certain amount of risk when design projects are undertaken for buildings and other structures, as well as for other projects such as roads and runways, pipelines, sewerage- and water works and pump stations.

Accepted levels of risk for these companies when accepting a particular appointment from a client are not always adequately quantified at the beginning of the project. This puts the company in a position where it may be subject to professional indemnity claims from clients and from the public, should something go wrong during a particular project.

The risk taken by the consulting engineer can to a large extent be quantified, and timeous mitigation measures can be taken to prevent certain things from occurring that may pose a threat to the successful construction and later use of the facility. As it is, the civil and structural engineering industry has a reputation that many projects run late and are over budget, not to mention the technical difficulties that might arise during the course of the project. This situation can to some extent be avoided by the introduction of a Quality Management System (QMS), which, if implemented and used correctly, should be able to identify and mitigate most of the risks that might arise from any project.

II. LITERATURE SURVEY

Recently the Quality management systems can be considered one of the important management systems that industrial companies deal with to improve the level of their performance. The competition between them is a good stimulus that makes these companies adopt this system in order to crown their works by quality without forgetting time and cost. A chronological survey of the available relevant studies and researches on quality of construction projects indicated that research work in this field is limited. The recent of these researches are:

[1] In 1990, in CIB, J. Benes and J. Bruijn published a paper in which they stated the requirements to judge the communication between various partners in the construction process for taking the right decisions about quality.

[2] In 1990, in CIB, W.B. Ledbetter and J.L. Burali, published a research in which they aimed to reduce the total

cost of quality by managing it more effectively and striving for zero rework through a system which provides the project management with relevant, timely information concerning the details of quality efforts and results.

[3] In 1997, Ibtisam Al-Talibi has conducted a research aiming to develop a system for managing quality of design and using it as a tool to minimize design faults. This is done by identifying the reasons of design faults and their effects, the current applied activities concerning design quality management and measures to improve it.

[4] In 1998, D. Arditi and H. Hurat published a paper in which they dealt with a Total Quality Management programme in the construction process. This research explained the main elements of total quality management in construction industry with explaining the main obstacles that may prevent the engineer to apply this system in construction projects.

[5] Recently, Al-Ani (2005) has conducted a research on the quality requirements for designing the engineering project. He concluded that there are certain factors affecting the quality of engineering project design. An integrated quality management system has been proposed to improve the quality of the engineering project design. The above literature review has concluded that there is a crucial need to deal with modern quality management systems. In order to make this experiment successful, it is required to move in a parallel way, step by step, with the quality management system development in the world, especially in the construction industry.

III. OBJECTIVE

Primary Objective:

The primary objective of this research can be formulated as follows:

- To evaluate the effectiveness of the current QMS as implemented for PQR Consulting Engineers.

Secondary Objectives:

The secondary objectives were as follows:

- To determine the understanding of a QMS by senior managers as well as the attitude of the employees who use the system towards the functionality of the QMS and its benefits.
- To determine whether the introduction of a QMS has changed the way in which senior managers approach their duties in any way, as well as their perception of the cost/benefit ratio of the system.
- To determine whether client satisfaction has improved since the introduction of the QMS.
- To determine whether the QMS can serve as a training tool for new employees, or whether it serves any other purpose.
- To determine whether a QMS can prevent or reduce PI claims against consulting engineers.
- To recommend improvements to the company's QMS system.

IV. RESEARCH WORK

The methodology for the work consists of three step model. The first step is quality planning, second step is quality control and third step is quality assurance.

In the first step the questionnaires have been prepared by authors considering quality aspects of construction project. Three types of questionnaires have been prepared by author for work. This paper describes the rating aspects based on importance on five-point scale.

In second step the interviews of participants of construction project have been conducted by the author. The brief details of respondents and their experience are shown in "Table 1". The third step includes analysis based on views of respondents.

Table 1 Respondents and their experiences

Sr. No.	Respondents	Experience in years
1	Project Manager (Owner)	15
2	Project Manager (Contractor)	20
3	Project Manager (PMC)	15
4	Project Engineer (Owner)	10
5	Project Engineer (Contractor)	12
6	Project Engineer (PMC)	10
7	Architect	10
8	Designer	15
9	Quality Manager	11
10	Project Manager	9

V. CONCLUSION

Based on the study reported in paper the following are the conclusions:

- The 80% respondents very strongly believe check lists and 60% preference to fish bone diagram are quality control tools used at construction projects.
- The 90% respondents very strongly believe that quality of workmanship in all construction activities and 80% to site review meetings with staff are main quality control measures used on site.
- The 90% respondents very strongly prefer customer satisfaction and 80% client satisfaction are the most important aspect for maintaining QMS at construction projects.

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