

IMPACT OF QUALITY MANAGEMENT IN CONSTRUCTION ON ITS PRODUCTIVITY

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Abstract- TQM is basically formed to increase quality goods and services, through continuous improvement so that increasing productivity. Productivity can be measured based on its type, namely total productivity and partial productivity is productivity of each resource includes human resources. Construction Professionals have not yet realized the importance of Quality management System in construction. The Quality Management System (QMS) in construction industry refers to quality planning, quality assurance, quality control. The main goal of construction industry is to ensure that construction projects are successfully completed within the constraints of best quality, stated period and at minimum possible cost. This study is an exploratory research conducted primarily to give insight about quality practices, tools, techniques, management commitment towards quality implementation in construction projects. It also explores the issues faced during the implementation of Quality Management Systems. The research uses a qualitative questionnaire approach to gather data. A case study which substantiates the questionnaire is conducted using content analysis method. Conclusions are drawn based on the results of the analysis and the case study data. Suitable suggestions on how to overcome the issues of implementation of QMS has been made by consulting the experts through an unstructured interview.

Key words: Quality Management System (QMS), Management Responsibility, Relative Importance Index (RII), Productivity.

1. INTRODUCTION

1.1 General:

Quality management in construction is the policies, processes and procedures put in place (typically by management) to improve an organization's ability to deliver quality to its customers - whether those customers are clients/owners, contractors or subcontractors - on a consistent and constantly improving basis. The Construction industry has a great influence on the economy of all countries. It is one of the parts that provide vital factors for the development of any economy. According to World Bank, the share of construction industry in developing countries is approximately between 6-9% of the Gross Domestic Product (GDP). (Unit, South Asia Sustainable Development, 2007) The construction industry is an important part of the economy and has a considerable impact on the efficiency and output of other industries. It is not possible having extensive investment in manufacturing, agriculture, or service sectors without construction of infrastructure facilities in place. Residential projects make up 85% of the Indian real estate market. Between 2015 and 2020, we expect demand to grow from approximately 880 million square feet to 1.35 billion square feet. While we also expect demand for hospitality, retail and commercial real estate to increase, residential real estate will continue to represent the bulk of the demand. The Reasons for high demand for residential real estate in Pune, include a continuing urbanization trend and reduced household sizes due to the rise of nuclear families

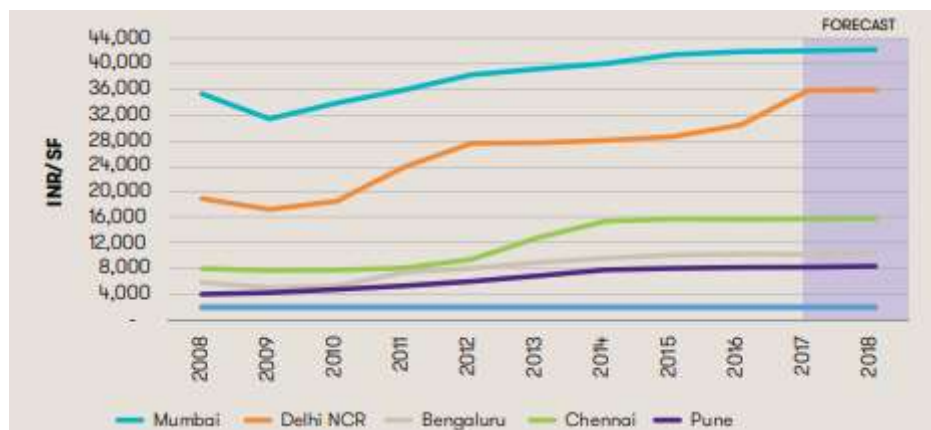


Fig 1.1: Average residential capital value trends (Source: GT India Research)

Pune has become one of the most sought after cities in the realty market. It has the advantages of being a stable market with consistent demand coming from a number of strong and dependable business sectors. Due to multiple

growth drivers, Pune has been witnessing large scale migration. Exhibit 8 presents this trend in Pune, which is fueling its housing demand.

Description	2011	2001
Actual Population	9,426,959	7,232,555
Male	4,936,362	3,769,128
Female	4,490,597	3,463,427
Population Growth	30.34%	30.73%
Area Square Km	15,643	15,643
Density/Square Km	603	462
Proportion to Maharashtra Population	8.39%	7.47%
Sex Ratio (females per 1000 males)	910	919
Average Literacy Rate	87.19%	80.45%
Male Literacy Rate	92.72%	88.34%
Female Literacy Rate	81.13%	71.89%

Fig 1.2: Census 2011 Key Highlights (Source: Census 2011)

Now quality management has become an integral part of construction. Acknowledging the quality issues in construction and increasing demand for quality products, specific regulations to the implementation of the Quality Management Systems have been framed. ISO 9001 standards were set up for this purpose.

1.1.1 Quality Management System:

The results of a survey on Quality in construction by FIDIC has clearly indicated that the failure in construction quality is a big problem worldwide. In order to attract customers, ISO certification has become a trend in most industries including construction industry. level of the customer.



Figure 1.3: World distribution of ISO 9001 certificates in 2013

1.1.2 ISO Quality Standards: ISO

"ISO (International Organization for Standardization) is the world's largest developer and publisher of International Standards. ISO is a non-governmental organization that forms a bridge between the public and private sectors. On the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations. Therefore, ISO enables a consensus to be reached on solutions that meet both the requirements of business and the broader needs of society. "(International Organization for Standardization (a))

ISO9001

ISO9001 is an internationally recognized standard for the quality management. ISO9001 standard applies to the processes that create and control the products and services an organization supplies. It prescribes systematic control of activities to ensure that the needs and expectations of customers are met. It is designed and intended to apply to virtually any product or service, made by any process anywhere in the world. ISO 9001 is one of the standards in the ISO 9000 family. (ISOQAR)

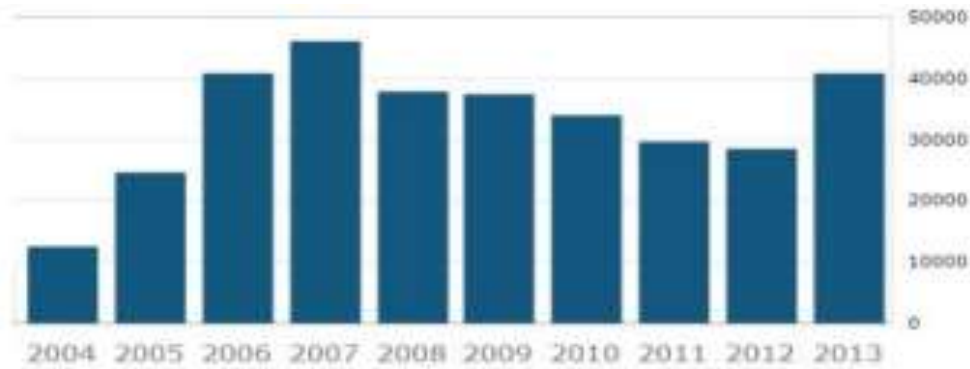


Figure 1.4: Evolution of ISO certificates in India

X-axis denotes the year and the Y-axis denotes the number of certifications in India. Considerable research has been conducted on QMS implementation within construction projects globally as well as in India. Most of the recent research are conducted on the advantages and disadvantages of implementation of QMS. Limited researches have been carried out on the issues faced during the implementation of QMS. The debates whether QMS is suitable for construction industry will never end.

1.1.3 Demand Supply mis-match in Pune Residential Real Estate Market:

Fig 1.5 shows that while maximum demand was witnessed in the 35-40 lakhs category homes, its supply was the least (rated 4). The maximum inventory supply was in the 40-60 lakhs category and the 2nd highest inventory supply was in the 60-80 lakhs category

	INR 35-40 lakhs	INR 40-60 lakhs	INR 60-80 lakhs	> INR 80 lakhs
Demand*	1	2	3	4
Inventory Supply*	4	1	2	3

Fig 1.5: Pune housing demand supply mis-match (Source: ICICI Property Services)

1.2 Research problem:

The real estate sector is one of the most recognized sectors across the world. In India it is next to agriculture sector i.e. second largest sector in terms of employment generation. The growth rate of this sector is expected at 30 % over next decade. Real estate sector can be categorized into four sub-sectors i.e. - housing, retail, hospitality, and commercial. The Indian real estate market is expected to touch US\$ 180 billion by 2020. (Christopher Crowe et al, 2012)

1.3 Research aim and objectives:

The main aim of this research is to help organizations to establish the standards of quality management system, and form it to document, implementing and maintaining it, and continually improving its effectiveness.

To fulfil this aim the following objectives will be achieved:

- To identify the processes needed for Quality Management System and its application in the construction organization.
- To determine the sequence and interaction of these processes.
- To determine the necessary criteria and methods to ensure the effective operation and control of these processes.
- To ensure the prevailing quality practices followed in the local construction projects and management commitment towards quality implementation.

1.4 Limitations of the study:

The work for evaluation of the impact of quality on construction projects is carried out only in the construction industry of Pune. The work is limited to the residential real estate sector only and the results will depend on the data obtained after pursuing interviews with the professionals engaged in this industry.

1.5 Need for study:

1. Quality is one of the critical factors in the success of construction projects. Quality of construction projects is linked with proper quality management in all the phases of project life cycle
2. Quality of construction projects is linked with proper quality management in all the phases of project life cycle.
3. Design and construction are the two important phases of project life cycle which affect the quality outcome of construction projects significantly
4. Further, quality of construction projects can be regarded as the fulfillment of expectations of the project participants by optimizing their satisfaction
5. Since the quality outcomes of the projects are not according to required standards, faulty construction takes place.

6. 6-15% of construction cost is found to be wasted due to rework of defective components detected late during construction and 5% of construction cost is wasted due to rework of defective components detected during maintenance. Hence, quality has become one of the most important competitive strategic tools which many construction organizations have realized

2. LITERATURE REVIEW

2.1 Overview of the literature:

Quality can be defined as meeting the legal, aesthetic and functional requirements of a project. Requirements may be simple or complex, or they may be stated in terms of the end result required or as a detailed description of what is to be done. However, the quality is obtained if the stated requirements are adequate, and if the completed project conforms to the requirement.

The concept of quality management is to ensure efforts to achieve the required level of quality for the product which are well planned and organized. However, in the construction industry, quality can be defined as meeting the requirements of the designer, constructor and regulatory agencies as well as the owner

In this chapter, Key research papers relating to quality, quality management, and quality management procedures in construction industry were reviewed in order to determine the importance of quality for construction project success.

2.2 The Research Carried Out by Various Researchers-

The extensive literature review was carried out by referring standard journals, reference books, I.S. Code and conference proceeding. The major work carried out by different researchers is summarized below:

- 1) **A.I. Romanova (2016), Improving the Quality of Construction Works in Terms of the Self- Regulation:**
The author researched on improving the Quality of Construction Works in Terms of the Self- Regulation. Author learned the concepts of implementing, managing the quality aspects in the construction management. The management related to quality will be researched by the self-regulatory organizations. As author study the existing system of the construction quality control in the Republic of Tatarstan and the established self-regulation system to propose measures of improving the quality of construction products.
The quality of constructions will improved by investing in the construction products. And also thus improve the self-regulations system and insurance arms. Further is the figure showing the measures and actions in the management of international quality,
- 2) **LI Qing, LIU Rengkui, ZHANG Jun, SUN Quanxin (2014), Quality risk management model for railway construction projects:**
The author mentioned about analyzing the quality risk management model for railway construction projects to overcome increasing of risk in the system. The main focus of author was to manage the combined concepts and process of the AFFTM including information technology and implementation scheme of a new risk management system. The railway management quality management leads to design and develop workable information tools quality risk management. Further author analyzed the data standards of RCPQPMIS and creates a model for tracking the quality risk for providing pre warning. So this paper presents the functional modules of the RCPQRMIS and its practical applications. Where the applications reveals the unified management of risk source information and multi-level sharing. As author describes that in future we will investigate methods to improve the data quality and to achieve further integration of the system functions in the risk management of railway construction projects.
- 3) **Turgut Acikara, Aynur Kazaz, Serdar Ulubeyli (2017), Evaluations of Construction Project Participants' Attitudes Toward Quality Management in Turkey:**
The author management the quality system related to construction in Turkey. The construction projects includes risk which author investigates to overcome the quality and risk issues by implementing or minimizing occurrence of risk at the construction sites. The quality management policy of project participants to quality management process will negatively affect the management of the project and competitiveness of the firms. Author make a questionnaire for 120 participants of construction projects in Turkey, which the feedback shows a positive response towards the need of quality in construction projects.
Author aimed to examine the attitude of employees towards TQM in a construction project build in Turkey. where a questionnaire consisting of 3 parts was prepared and administered face-to-face to 120 Employees. So as result, the questionnaire results revealed that almost half of the employees attended to a quality related training and these trainings is not sufficient for the quality management.

- 4) **Tao Yu , Qingpeng Man, Yaowu Wang, Geoffrey Qiping Shen ,Jingke Hong , Jiasheng Zhang , Jia Zhong (2019), Evaluating different stakeholder impacts on the occurrence of quality defects in offsite construction projects: A Bayesian-network-based model:**

The author researched on the quality defects in offsite construction projects which impacts by the stakeholders. The author aimed to enhance quality defect management in offsite construction projects where it is important to evaluate the different stakeholder impacts on the occurrence of quality defect. An evaluation model using the Bayesian network approach to measure stakeholder impacts on defect occurrence in offsite construction projects. The evaluation results enabled the identification of critical stakeholders and stakeholder-related factors. In a case study demonstrating the application of the evaluation model, use of precast components with quality defects, misoperations by construction workers, and ineffective quality inspection and testing during onsite assembly and construction were identified as the most important factors affecting quality defect control.

The results indicate that use of precast components with quality defects, misoperations by construction workers, and ineffective quality inspection and testing during onsite assembly and construction were the major factors affecting quality defect control.

- 5) **Javon Adams, Cassie Castorena, Y. Richard Kim (2019), Construction quality acceptance performance-related specifications for chip seals:**

The author describes the research on the construction quality on establishing framework for construction quality. The management will be categorized and author in this paper aim the objective to determine appropriate test methods to evaluate each defined AQC. The relationships that are established between the AQCs and chip seal performance are used to define performance ranges and threshold values for a particular performance measure. Also to determine the whether a chip seal lot passes the PRS threshold values and whether the contractor receives full pay, is subject to a pay penalty, or fails the construction PRS and must correct the chip seal within the first year in service, which constitutes the typical warranty period for contracted chip seal work.

- 6) **Arash Hosseini, Ahmed Faheme , Hani Titi, Scot Schwandt , Evaluation of the long-term performance of flexible pavements with respect to production and construction quality control indicators:**

The author researched on Evaluation of the long-term performance of flexible pavements with respect to production and construction quality.

This paper describes by the author on details process to develop a framework for connecting pavement construction quality control indicators to long-term performance at the network level. To define the statistical correlation between quality during asphalt mix production and surface construction to in-service performance this paper demonstrates the ability of the developed system.

Author performs the survey on four basic indicators which are transverse, longitudinal, alligator cracking and rutting. In the form of Deterioration Index the distresses on the pavement was calculated. As per author the results on rutting and alligator cracking are found to be sensitive to quality deviation in air voids (V_a), voids in mineral aggregate (VMA), and in-place density.

- 7) **Nokulunga Mashwama, Clinton Aigbavboa & Didi Thwala (2017), An Assessment Of The Critical Success factor For The Reduction Of Cost Of Poor Quality In Construction Projects In Swaziland:**

The author mentioned the research on the assessment of the Critical Success factor For the Reduction of Cost of Poor Quality in Construction Projects. The poor quality of construction work deals with the 40% of revenues that is used for managing the quality of projects. Author research adopted quantitative research and 50 useable questionnaires were used as an instrument tool for the study. The Swaziland deals with the construction industry that was impact with poor quality and due to cost effects to the construction companies needs funds to improve the quality of construction that is not getting tolerated by the system. As under-pricing the construction project and rectifying construction mistake it becomes a big problem for the contractor. Author revealed that are a lot of success factors such as the use of quality management system and the critical success factors can actually help eliminate poor quality in most construction projects of Swaziland.

- 8) **Mahajan Ganesh S, (2016), Poor quality in building projects:**

The author researched on the poor quality in building projects. The main reason in the cost of quality which deals with the funds in construction projects. Author aimed to overcome and identify the cost of quality so that one can determine the expenses associated with the use of quality in construction industry. The objective of the author is to consider different projects in industry which focus on construction defects on respective projects and poor quality cost measurement.

- 9) **Ka Chi Lam b, S.Thomas Ng (2006), A cooperative Internet-facilitated quality management environment for construction:**

The author researched on the quality management environment for construction. The aim was to improve in quality at both project and organization levels has not been truly realized. Author analyzed an automated and user-friendly

quality management system would be helpful. As The concept of the cooperative IFQM environment is justified and illustrated in this paper. There is a need for construction stakeholders to work collaboratively by sharing useful data, like those pertinent to QM, to other parties concerned, so as to keep everyone informed of the development and compliance of critical decision processes.

The conceptual framework was validated by eleven experts representing various disciplines in construction, and they believed the proposed model could

- (i) Enhance quality;
- (ii) Improve communication and coordination
- (iii) Allow quality data to be analyzed
- (iv) Facilitate internal and external audits
- (v) Unveil complaints
- (vi) Increase transparency.

10) Fei Cheng, Research on construction quality and improvement of assembly construction:

The author researched on the construction quality and improvement of assembly construction. The main aim of the author was to increase the demand of the construction management by improving the quality in the urban areas. The quality improvement and thus the efficiency of the construction leads to be promoted by the industry. The study focus on the analysis of the connotation of the assembly structure and analyzes the quality problems in the construction process of the construction projects and puts forward the improvement measures to promote the improvement of the building quality and the construction of the building Construction speed. Also author this paper analyzes the structural system and design of prefabricated building. At results the author believed that the implementation of relevant measures in place and technological development use to promote the sustainable development of the construction industry.

3. METHODOLOGY

3.1 Introduction

Methodology refers to the total sum of techniques of data collection, tool and the methods of analysing data and theoretical perspective or orientation that govern research. This section provides an overview of research approach adopted in the study which lays within the mixed methods strategies. It discusses research approach adopted and survey design of the study.

3.2 Research Design

Research design is the blueprint for fulfilling research objectives and answering research questions, In other words, it is a master plan specifying the methods and procedures for collecting and analysing the needed information. This is to identify and analyse all the elements of phenomenon, processor system such as identification and recording will be done from a particular perspective and often for a specified purpose, However it should always be done as objectively and accurately. The three alternative approaches that can be used in conducting a given research. The alternative approaches they identify are quantitative, qualitative and mixed research approach. Quantitative research approach focuses primarily on the construction of quantitative data, and quantitative data is a systematic record that consists of numbers constructed by researcher utilizing the process of measurement and imposing structure. The quantitative research approach employ measurement that can be quantifiable while qualitative cannot be measured. In mixed research approach inquirers draw liberally from both qualitative and quantitative assumptions.

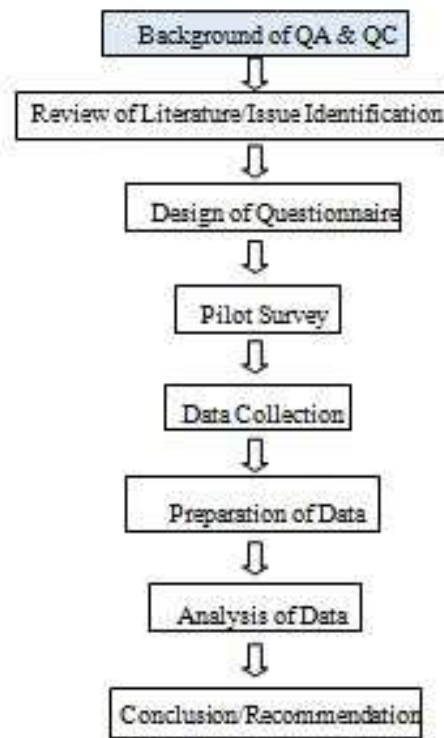


Figure 3.1. Flow Chart Showing Research Structure.

3.3 Population Technique

This study has intent to assess the practice of quality control management in Construction Company. To do this, the methods employed are survey design. Survey research of gathering information, usually through self-report using questionnaires or interviews. Its purpose is to generalize from a sample to a population so that inferences can be made and it is also economical and rapid turnaround in data collection. The populations considered in this study were the number of top middle management members, project managers, construction equipment administration and maintenance case team leaders of head office and projects, and senior technicians in which purposive non-probability sampling is adapted to rich evidence.

3.4 Type of data Collection and instrument tool

The study used both primary and secondary data. Here there are two basic sources of data sources namely, primarily and secondary source, in this study both primary and secondary sources of data was utilized through questionnaires, interview and literature review, observation check list & flows group discussion guide, etc. Primary sources of data include interview and questionnaire, these questionnaires and interview were composed of both open ended and closed ended items, whereas secondary sources data were generated through a review of relevant documents.

Questionnaire

In order to realize the target, the study used well-designed questionnaire as data collection instrument. Questionnaires were distributed top and middle management members, project managers, construction equipment administration and maintenance case team leaders of head office and projects, and senior technicians.

Interview

Semi structured interview with middle management members, project managers, construction equipment administration and maintenance case team leaders were conducted. It allowed the investigator some degree of flexibility at the time of interviewing for the pursuit of unexpected line of inquiry which was arising at the study progresses. Questions in the interview checklist were constructed based on the review of literature. In the process of preparing, testing and using the instruments, the following procedures have been followed.

3.5 Procedure of Data Collection

In order to assess quality management practices in the Company data was collected from primary and secondary resources. In case of primary resources, first we select & categorize target groups and preparing survey questionnaires & submit interview /discuss with the target group & finally collect the filled questionnaires from the respondents, on the other hand in the secondary data, we collected data from writer reports & publication of project reports,

documents, articles, journals, books, internet sources & other related sources by selecting the document we will use it.

3.6 Method Data Processing and Analysis

As explained in the preceding part, the research is designed to follow a mixed method. To this end, both qualitative and quantitative analyses were used. Data collected using questionnaire was analyzed through descriptive statistics, frequency distribution using Statistical Package for the Social Scientists (SPSS). It helps to describe what the data look like, where their centre (mean) is, how broadly they are spread in terms of one aspect to the other aspect of the same data. The SPSS version 21 is used to find out percentages, mean values, frequencies, correlations, etc. as main means for summarizing the data. Data collected from the interview and reviews of documents are interpreted qualitatively. In analysing the data from interviews, narrative approaches including quotations from respondents have been used.

4. RESULT AND DISCUSSION

4.1 Introduction

This chapter explains and discusses the results of findings based on the analysis done on the data collected. The results of the study are discussed by triangulating the different sources results: questionnaire results, interview and document review results. The discussion attempts to accomplish the objectives of the study and answer the research questions. A total of 68 questionnaires which dealt with construction equipment management practice and other aspects were distributed to the respondents of the company. However, only 52 questionnaires were collected and had usable responses (95.4% response rate), interview and relevant documents have been also reviewed. Considering the difficulty of collecting data in construction company projects, a (95.4%) response rate was reasonably very good.

4.2 General Information about Respondent

Table 4.1 shows general information about sex, education qualification, work experience, and job position of respondents. Most (81.5%) of respondents are male and only 18.5% are of female respondents.

Table 4.1. General Information about Respondents

Variable	Frequency	Percentage
Sex		
Female	12	18.5
Male	53	81.5
Total	65	100
Educational qualification		
ME\M.Tech	5	7.7
BE\B.Tech	42	64.6
Diploma	16	24.6
Below diploma	2	3.1
Total	65	100
Work experience		
Less than 5 years	7	12.8
5-10 years	13	20
11-15 years	32	49.2
Above 15 years	13	20
Total	65	100
Job position		
Top management	5	7.7
Middle management	15	23.1
Project management	13	16.9
Equipment administration case team leaders and senior technicians	20	30.8
Total	65	100

Source: Own Calculation

Majority (64.6%) of respondents has an educational qualification of degree and followed by diploma holders which accounts 24.6%. only 7.7% and 3.1% are second degree and diploma holders respectively.

4.3 Column Work

A column work is a set of procedure for setting the framework for managing quality. it enhances and improves effective quality control within an organization.

4.4 Construction quality

From survey result (Table 4.3) majority (76.9%) of respondents agreed that Is there any kind of quality problem arise due to improper shuttering work . However, most of respondents (86.1 % with mean response 1.9 and standard deviation of 0.7) stress that the prevailing quality problem guideline, procedure and manuals are not clear and easily understandable. The interview result also suggested that existing Quality control manual did not cover various aspects of Quality management.

Budgeting (Planning)

Two important factors were set to check whether the company prepared annual budgeting and whether it uses standard forms for the capital budgeting purposes. The majority (about 90%) of respondents agreed that the company agreed quality problem arise due to poor design prepares short and long range capital budgeting for acquiring construction quality control. It was revealed by the interview that the enterprise appreciates quality control for augmenting its capacity and become competitive in the construction sector. However, respondents neither agreed nor disagreed on the use of standard forms for quality control purpose by the construction company.

Table 4.2.Descriptive Statistics

NO	Variable	MN	SD	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Does poor cover block placement affect the quality	3.8	1.2	7 (10.8%)	4 (6.2%)	1 (1.5%)	38 (55.8%)	15(23.1%)
2	Is there any kind of problem arise related to electrical lining	4.2	0.5	-	1 (1.5%)	-	51 (78.5%)	13 (20%)
3	Is there any kind of quality problem arise due to manpower in site	2.9	1.1	10 (15.4%)	17 (26.2%)	11(16.9%)	27 (41.5%)	-
4	Is there any kind of quality problem due to equipment used in site	2.5	0.9	9 (13.9%)	27 (41.5%)	19(29.2%)	10 (15.4%)	-
5	Does the quality of concrete is affect the quality of slab	2.3	1.0	14 (21.5%)	35 (53.8%)	2 (3.1%)	14 (21.5%)	-
6	Obsolesce	4.2	0.8	-	2 (3.1%)	10 (15.4%)	28 (43.1%)	25(38.5%)
7	High cost of investment	3.2	1.1	-	30 (46.2%)	-	28 (43.1%)	7 (10.8%)

Source: **Own Calculation**

The survey result (shown in table 4.8) indicated that majority of the respondents agreed any kind of problem arise related to electrical lining (78% with mean response4.2 and standard deviation 0.5), cover block placement affect the quality quality problem due to improper drawing study (55.8% with mean response 3.8 and standard deviation 1.2), and the right angle marking is affect the quality of block work (with mean 4.2 and standard deviation 0.8) were identified as major factors in influencing equipment replacement decision.

Table.4.3. Descriptive Statistics

NO	able	MN	SD	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Is there any kind of quality problem due to manpower in site	1.7	1.0	3 (9.7%)	17(54.8%)	6(19.4%)	-	-
2	Is there any kind of problem due to not pointing of joints	1.3	0.8	10 (32.3%)	15(48.4%)	1(3.2%)	-	-
3	Is there any kind of quality issue due to curing of wall.	1.9	1.1	3 (9.7%)	13(41.9%)	8(25.8%)	2 (6.5%)	-

Source: Own Calculation

Respondents were asked on the way how the enterprise disposes quality problem due to manpower in site that are cease to function economically Survey result (in table 4.9) indicated that respondents disagreed with existence of any of aforementioned kind of quality problem due to manpower in site. This proposition was also confirmed by interviews of top and middle management members; They also suggest the enterprise should develop and implement old method if it is to know overall economically functioning equipment and to make further decisions in the future.

Table.4.4. Descriptive Statistics

NO	Variable	MN	SD	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Does the mortar proportion affect the quality	4.2	0.6	1 (1.5%)	-	1(1.5%)	46(70.8%)	17(26.2%)
2	Is there any kind of quality problem due to manpower in site	4.0	0.5	-	-	7(10.8)	49(75.4%)	9(13.8%)
3	Is there any kind of quality issue due to curing of surface	4.0	0.6	-	1 (1.5%)	10(15.4%)	41(63.1%)	13(20%)
4	Standardizations can make ease for CE management issues	4.1	0.6	-	-	13(12.3%)	40(61.5%)	17(20%)

Source: Own Calculation

One of the most important aspects of heavy construction policy is quality management standardization. Respondents were asked to express their view on the benefit of standardizing construction process. As shown in table 4.12 below, majority of respondents (70% with mean response 4.2 and SD 0.6) agreed with the mortar proportion affect the quality. According to them, poor the mortar proportion affect the quality of management owned by company is the multiplicity of different types, makes, models and usage of different technique. The survey result (as indicated in table 4.12 above) also indicated that most of respondents (75.4% with mean response 4.0 and SD 0.5) agreed that standardization kind of quality problem due to manpower in site (63.1% with mean response 4.0 and SD 0.6), and kind of quality problem due to manpower in site (61.5 with mean response 4.0 and SD 0.5). Likewise, the interview result asserted in addition to aforementioned benefits, standardization can also kind of quality problem due to manpower in site

CONCLUSION

This study examined the construction quality management practices and challenges that arise at construction Company. Three research questions were developed and tested in this study. The first question is to understand the practice of construction quality control management. The second question is to understand the challenges faced by the company in the process of practicing quality management in construction. The last question is to assess the different factors issues that are related to impact of quality management in construction. The study used document analysis (annual performance reports and other documents), interview with top and middle management members and self-administered questionnaire to top and middle management, project manager's construction equipment administration and maintenance case team leaders of head office and projects, and senior technicians. Questionnaire data were analyzed using descriptive statistics and data from interview and document reviews were interpreted

qualitatively. Equipment management remains a critical competency for the success of construction firms. An internally developed technical and financial criterion is adopted by the company to select construction management. Least price, standardization and management decision are the three major criteria used in the quality management selection process. It was revealed in the study that Construction Company did not have well organized and integrated quality management maintenance system. Corrective and unscheduled type of maintenance is mostly practice in the construction company. As a result of limited practice of corrective type of maintenance in the construction company, construction projects are not accomplished as per their contractual schedule. It was revealed in the survey as there was no appropriate ways such as Construction Company own database and formally organized use of other company experience upon which construction quality is determined in the construction company. Quality standardization is believed to improve the overall performance of equipment management activity. It plays an important role by increasing the availability of spare part, lowering maintenance cost, improving safety and supplier relationship in the process of equipment maintenance activity. Survey result reveals as construction quality management record keeping is weak in the construction company. Because of lack of continuous monitoring, controlling and timely action to adjustments by the enterprise, equipment utilization, daily report by operator, timely equipment utilization report, equipment costs and maintenance data and costs records are not properly undertaken in appropriate manner. Moreover, the existence of manual based method of quality control record keeping makes quality activity more difficult.

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