

Project Management and its Effects of Quality Control in Construction Sector

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ABSTRACT

Quality is the symbol of human civilization, and with the progress of human civilization, quality control will play an incomparable role in the business. It can be said that if there is no quality control, there is no economic benefit. Construction projects are an extremely complex process, involving a wide range. There are plenty of factors affecting the quality of construction, such as design, materials, machinery, topography, geology, hydrology, meteorology, construction technology, methods of operation, technical measures, management systems, and so on. Because of the fixed project location, large volume and different location of different projects, the poor control of these factors may produce quality problems. During controlling the whole process of construction, only accord with the required quality standards and user promising requirements, fulfilling quality, time, cost, etc., construction companies could get the best economic effects.

Keywords— Quality Control, PDCA Cycle, Quality Control System

I. INTRODUCTION

Quality is the symbol of human civilization, and with the progress of human civilization, quality control will play an incomparable role in the business. It can be said that if there is no quality control, there is no economic benefit. Construction projects are an extremely complex process, involving a wide range. There are plenty of factors affecting the quality of construction, such as design, materials, machinery, topography, geology, hydrology, meteorology, construction technology, methods of operation, technical measures, management systems, and so on

Quality is one of the critical factors in the success of construction projects. Quality of construction projects, as well as project success, can be regarded as the fulfilment of expectations (i.e. the satisfaction) of the

project participants. The construction industry in India has been struggling with quality issues for many years. A significant amount of the budget is spent each year on infrastructure and other development projects. Since the quality outcomes of the projects are not according to required standards, faulty construction takes place.

Quality Control in Construction Sector

This part includes the terminologies used in quality management system. These definitions place a major role in quality management because researcher's definitions are the basic. From the basic we can understand about quality management. According, the effectiveness of implementation of quality control and implementation of quality system are also justified.

The concept and contents

The quality of the construction process is the quality of integrated action due to human, material, machinery, process methodology and work environment, also known as process quality, which reflects the quality of products.

Process quality control is implemented on the process conditions for the activities (the quality input of process activities) and effectiveness of the process activities (the quality of sub-project). The following work should be focused on during process quality control.

Determining the program of process quality control

On the one hand, specific measures to ensure quality of technology for the different processes, and the provision of inputting materials and the order of activities are required. On the other hand, the work flow and quality inspection system are needed.

Controlling the quality of conditions of process activities actively

There are five main factors affecting the quality of process conditions: human, materials, machinery, equipment and methods, and the environment.

Inspecting the quality of effectiveness of process activities in a timely manner

The implementation includes, self-inspection, mutual inspection, the handover inspection of upper and lower working procedure, especially for hidden works and sub-items

Setting the process control point (process management point) with key control

Process quality control points are major control objects determined for the key components affecting quality or weaknesses.

Control points should be set correctly and implemented strictly.

Elements of Quality Control

One way of distinguishing the elements of quality control shows that there is a classification of four natural elements.

New Design Control

Through the first element, the quality control effort on a new product is being conducted, while its marketable characteristics are being selected, the design parameters are being established and proved by prototype tests and the manufacturing process is being planned and initially cost. While the quality standards are being specified, both the product and process designs are reviewed to eliminate any possible sources of quality troubles which may appear before the start of a formal production and to improve maintainability and eliminate any threats to product. The second element represents the procedures for actual acceptance of materials, parts and components that are purchased from other companies or, perhaps, from other operating units of the same company. Occasionally, incoming material control applies to the parts that are produced in one area of a factory to be used in another area of the same factory reliability.

Product Control

The product control element involves the control of products at the source of production so that departures from quality specifications can be corrected before defective products are manufactured. It does not only involve the materials, but also the control of processes that contribute to the quality characteristics during the manufacturing operation. This control seeks to deliver a reliable product that will perform satisfactorily during its expected life and under the conditions of use.

II. REVIEW OF LITERATURE

1 Quality Practices in Building Project

Quality, in construction projects should be regarded as the full fulfillment of expectation of those contributors involved in such projects. Although a significant amount of quality practices have been introduced within the industry, attainment of reasonable levels of quality in construction projects continues to be an ongoing problem. To date, some research into the introduction and improvement of quality practices and stakeholder management has been undertaken, but so far

no major studies have been completed that comprehensively examine how greater consideration of stakeholders' perspectives of quality can be used to contribute to final project quality outcomes. This paper aims to examine the requirements for development of a framework leading to more effective involvement of stakeholders in quality planning and practices thus ultimately contributing to higher quality outcomes for construction projects

2 Importance of Quality

Construction projects are always expected to create a balance between cost, time and quality. It is possible to have high quality and low cost, but at the expense of time, and conversely to have high quality and a fast project, but at a cost. High quality is not always the primary objective for the client; however, it is extremely important to a successful project. An appropriate level of quality could be determined during all phases of the construction project. Specially, construction and commissioning are two critical phases where the project could impact by its operability, availability, reliability, and maintainability of a facility.

3 Barriers and Benefits of Quality

The industry's clients are moving forward. Clients demand improved service quality, faster building and innovations in technology. It is no accident that the construction industry has turned to the manufacturing sector as a point of reference and source of innovation. Successful concepts derived from manufacturing, such as Total Quality Management (TQM), Lean (or Just-in-Time) Production and Reengineering, are being adopted and integrated into the construction industry. Implicitly, the successful implementation of these concepts is heavily dependent on a culture of teamwork and cooperation at both intra- and inter-organisational levels.

4 Utility and Statistical of Quality Control

Statistical Process Control (SPC) aims to control quality characteristics on the methods, machine, products, equipment both for the company and operators and magnificent seven. Some simple techniques like the "seven basic quality control (QC) tools" provide a very valuable and cost effective way to meet these objectives. However, to make them successful as cost effective and problem solving tools, strong commitment from top management is required. Statistical process control (SPC) is one of the important tools in quality control (QC). In order to survive in a competitive market, improving quality and productivity of product or process is a must for any company.

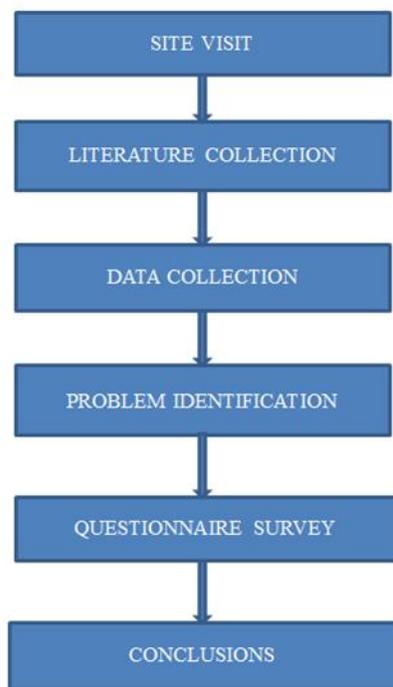
5 Quality Control in Construction

The development of construction industry depends on the quality of construction projects. Quality is one of the critical factors in the success of construction projects. Improvement in the quality of construction projects is linked with quality management in the project life cycle. Although quality management at every stage of

project life cycle is important but the quality management at the execution (construction) stage contributes significantly on final quality outcome of construction projects. Quality is one of the critical factors in the success of construction projects. Quality of construction projects, as well as project success, can be regarded as the fulfilment of expectations (i.e. the satisfaction) of the project participants. The construction industry in India has been struggling with quality issues for many years.

III. METHODOLOGY

Based on the research question and objectives, a methodology of quantitative approaches is employed to collect the relevant information associated with the current status of quality control practices and organizational issues, within the various construction industries. Prior to undertaking the quantitative questionnaire survey a preliminary study was carried out. Each project approach was supplemented by a detailed analysis and interpretation of the data collected.



IV. QUALITY PROBLEMS IN CONSTRUCTION

The manufacturing industries are establishing the quality control system, but in construction industry we cannot establish even Quality control. The reason behind is every construction project is unique and quality is ever changing factor i.e. quality change time to time, place to place.

- Problems concerning the construction procedures and regulations
- Problems of design and calculation
- Substandard materials and products
- Out of control of construction and management
- The influence of natural conditions
- Improper use of facilities standard materials and products

The Treatment Scheme of Quality Control

According to the case of quality problems, there are four different types of treatment options. The treatment scheme of quality accident should be carried out based on the proper analysis and judgment of the cause of the accident.

Repair treatment

This is one category of the most commonly used treatment options. Usually, the quality of some parts of the project does not achieve the required norms, standards or design requirements. In other words, there are some flaws, it can also be up to the required standards after repair, without compromising function or appearance requirements. In this case, the decision of repair treatment can be made.

Rework deal

When quality of the project does not meet the required quality standards or requirements, and there are obviously serious quality problems, with significant impacts on the use and safety of the structure, besides the defects cannot be corrected through the repair approach, the decision of rework deal can be made

Use restrict

When quality of the project cannot be guaranteed to reach the use requirements of safety by the repair treatment, but rework deal cannot be done in the actual situation, restrictions on the use can be made.

No treatment

The quality of some product do not meet quality requirements or standards, but it is not very serious, and has few effects on the use and safety of the structure, after analysis, argument and careful consideration, the decision of no special treatment can be made. The contents for this are:

- It doesn't affect the structural safety and use.
- It has some slight quality problems, but can be made up after follow-up processes. After review and check, it still meets the design requirements although with arisen quality problems.

PDCA Cycle

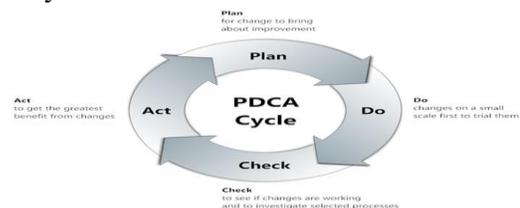


Figure 1: PDCA Cycle

PDCA is a scientific management procedure and method to do quality control of construction, named PDCA Cycle, which is composed of 4 stages of P (plan), D (do), C (check), A (action).

V. DESIGN OF QUESTIONNAIRE

A questionnaire was designed to study more about the quality management practices in the construction industry and ways to improve quality in construction works. The questionnaires were prepared with reference of literature reviews and field persons like contractors, engineers, project managers and consultant. Because field people are very well know about, what are all the factors affecting the quality majorly.

Is formal training in quality control is given to the employees			
Employees who are aware of the importance of quality			

Question	Yes	No	Sometimes
Will quality works in organization			
Quality control program be beneficial to the organization			
Organisation have any quality improvement program			
Quality control program be beneficial to the organization			
Supervisory staff who have undergone quality improvement training			

Constructi on quality	Strongly satisfac tion	Satisfi ed	Neither satisfie d nor not	Dissatis fied	Stro ngly dissa tisfie d
Project quality					
Material quality					
Equipment quality					
Adequacy of job site personnel					
Quality of workmans hip					
Knowledg e of project					
Time completio nof project					

Construc	Strongly	Satisf	Neither	Dissatis	Stro
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tion quality	satisfaction	ied	satisfied nor not	fied	ngly dissatisfied
Knowledge of client needs					
Adequacy of planning					
Adequacy of training					
Relationship between parties					
Project cost within in the budget					

Question	Yes	No	Sometimes
Does the column marking is affect the quality?			
Is there any kind of quality problem arise due to poor design?			
Does the poor quality of concrete is affect the quality of column?			

VI. CONCLUSION

Through the research, there was learnt the function and importance of quality control. The aim of the research on the quality control is to find out the shortcoming of quality management of enterprise, then to make progress through the research, so as to improve the quality of product, work, and service, while strengthen the quality management system, and raise the overall level of quality management. For a construction organization, the quality of construction project is the protection of all the work

The systematic quality management system should be applied. The quality of each process and project can be ensured through systematic planning, control and inspection. The waste of workforce, machinery, materials and other costs can be avoided, as well as the schedule delays. It has been found out that the scientific quality management system can ensure the rational allocation of project resources, and make the project run on the preconcent quality objectives, so as to achieve the effect of project quality control.

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