

Assessment of Quality Management In Construction Projects

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Abstract- *Quality is very important factor in construction industry. Construction industry plays an important role in the development of any country. 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. The development of construction industry depends on the quality of construction projects. Improvement in the quality of construction projects is linked with quality management in the project life cycle. This paper deals with the theoretical information of quality management.*

Keywords- concept of quality in construction project, quality assurance quality management, quality control. Characteristics Of Quality Management

I. INTRODUCTION

Quality management is the very important point in construction project because cost ,time and the role of it for any construction company is not individual activity, but interrelated with all the managerial and operational processes of the company for attraction of customer's satisfaction which gives long duration business survival and competitiveness for the firms . It is must required for construction company to replenish current construction market which is highly competitive and challenging and it has to provide the environment within which related tools, techniques and procedures can be deployed effectively leading to operational success for a company. At the end of the paper, an illustrative example will be presented to demonstrate and verify the applications of the quality management in construction projects in the light of the scientific basics it in this industry and improved it through the preparation of a survey of systems and specifications for the construction industry through many people working in the construction industry and find some solutions and proposals that can contribute to avoid the problems of implementation the quality management in this industry.

OBJECTIVES

TO assure quality of project.

To understand the values of quality management.

To apply techniques of quality management

SCOPE

It's a challenge now a days to complete construction project with good management of construction work for professionals. The construction industry in India has been struggling with quality issues for many years. this can be achieved by good assessment of quality problems and effective solution for that so that construction work should be achieved perfection level and fulfill costumers demand totally. By this study it is try to solve quality problems which are barrier in completion of project with less time and in less cost so that costumer demand can be achieved.

DEFINITION OF QUALITY MANAGEMENT

Quality Management is the act of overseeing all activities and tasks needed to maintain a desired level of excellence. This includes the determination of a *quality policy*, creating and implementing *quality planning* and *assurance*, and *quality control* and *quality improvement*.

II. QUALITY CHARACTERISTICS

All material or services have characteristics that facilitate the identification of its quality. The characteristics are part of the conditions of how the material, equipment and services are able to meet the requirements of the project and are fit for use by the beneficiaries. Quality characteristics relate to the attributes, measures and methods attached to that particular product or service.

1 Functionality is the degree, by which equipment performs its intended function, this is important especially for clinical equipment, that the operation should be behave as expected.

2 Performance, its how well a product or service performs the beneficiaries intended use. A water system should be designed to support extreme conditions and require little maintenance to reduce the cost to the community and increase its sustainability.

3 Reliability, it's the ability of the service or product to perform as intended under normal conditions without unacceptable failures. Material used for blood testing should be able to provide the information in a consistent and dependable manner that will help identify critical diseases. The trust of the beneficiaries depend on the quality of the tests

4 Relevance, it's the characteristic of how a product or service meets the actual needs of the beneficiaries, it should be pertinent, applicable, and appropriate to its intended use or application

5 Timeliness, how the product or service is delivered in time to solve the problems when its needed and not after, this is a crucial characteristic for health and emergency relief work

6 Suitability, defines the fitness of its use, it appropriateness and correctness, the agriculture equipment must be designed to operate on the soul conditions the beneficiaries will use it on.

7 Completeness, the quality that the service is complete and includes all the entire scope of services. Training sessions should be complete and include all the material needed to build a desired skill or knowledge

8 Consistency, services are delivered in the same way for every beneficiary. Clinical tests need to be done using the same procedure for every patient. Quality characteristics are not limited to the material, equipment or service delivered to the beneficiaries, but also applies to the material, equipment and services the project staff uses to deliver the project outputs. These include the vehicles, computers, various equipment and tools and consulting services the project purchases and uses to carry out its activities. Quality characteristics must be included in all material, equipment and services the project will purchase, the procurement officers must have a complete description of what is required by the project, otherwise a procurement office may purchase the goods or services based on her or his information of the product.

III. QUALITY ASSURANCE

Assurance is the activity of providing evidence to create confidence among all stakeholders that the quality-related activities are being performed effectively; and that all planned actions are being done to provide adequate confidence that a product or service will satisfy the stated requirements for quality. Quality Assurance is a process to provide confirmation based on evidence to ensure to the donor, beneficiaries, organization management and other stakeholders that product meet needs, expectations, and other

requirements. It assures the existence and effectiveness of process and procedures tools, and safeguards are in place to make sure that the expected levels of quality will be reached to produce quality outputs.

Quality assurance occurs during the implementation phase of the project and includes the evaluation of the overall performance of the project on a regular basis to provide confidence that the project will satisfy the quality standards defined by the project. One of the purposes of quality management is to find errors and defects as early in the project as possible. Therefore, a good quality management process will end up taking more effort hours and cost upfront. The goal is to reduce the chances that products or services will be of poor quality after the project has been completed. Quality assurance is done not only to the products and services delivered by the project but also to the process and procedures used to manage the project, that includes the way the project uses the tools, techniques and methodologies to manage scope, schedule, budget and quality. Quality assurance also includes the project meets any legal or regulatory standards.

IV. QUALITY AUDITS

Quality audits are structured reviews of the quality management activities that help identify lessons learned that can improve the performance on current or future project activities. Audits are performed by project staff or consultants with expertise in specific areas. The purpose of quality audit is to review how the project is using its internal processes to produce the products and services it will deliver to the beneficiaries. Its goal is to find ways to improve the tools, techniques and processes that create the products and services. If problems are detected during the quality audits, corrective action will be necessary to the tools, processes and procedures used to ensure quality is re established. Part of the audit may include a review of the project staff understanding of the quality parameters or metrics, and skills expertise and knowledge of the people in charge of producing or delivering the products or services.

If corrective actions are needed, these must be approved through the change control processes.

V. QUALITY CONTROL IN CONSTRUCTION PROJECTS

Quality control is a process by which entities review the quality of all factors involved in production. ISO 9000 defines quality control as "A part of quality management focused on fulfilling quality requirements". Controls include product inspection, where every product is examined visually,

and often using a stereo microscope for fine detail before the product is sold into the external market. Inspectors will be provided with lists and descriptions of unacceptable product defects such as cracks or surface blemishes for example. Quality control emphasizes testing of products to uncover defects and reporting to management who make the decision to allow or deny product release, whereas quality assurance attempts to improve and stabilize production (and associated processes) to avoid, or at least minimize, issues which led to the defect in the first place. Quality Control of Production factors was divided as the following: The contents of human control includes the overall quality of organization and individual's knowledge, ability, physical condition, psychological state, quality consciousness, behaviour, concept of organizational discipline, and professional ethics. Materials (including raw materials, finished products, semi-finished products, components and parts) are material conditions of construction, and material quality is one of necessary conditions to ensure construction quality. Construction machinery and equipment are essential facilities for the modern construction, reflecting the construction power of the enterprise, and having a direct impact on the project progress and quality. Actually, the quality control is to make the type and performance parameters of construction machinery and equipment match the conditions, technology and other factors of the construction site. Construction methods are reflected in the concentration of technical solution, process, testing methods, and arrangements of construction procedures for construction adopted by construction contractors. Creating a good environment will play an important role in guaranteeing the quality and safety of construction projects, achieving civilized construction, and setting social image of Construction Corporation. Control of construction environment includes not only the understanding, restriction, transformation and usage of natural environment, but also activities of creating working environment and environment management. CC has adopted a kind of 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). PDCA Cycle is ongoing. The quality goals can be realized and some problems can be solved in each cycle, so that the quality can be improved. The detailed procedures of PDCA are introduced as shown in fig.

VI. CONSTRUCTION QUALITY PROBLEMS

Construction quality problems are generally divided into defects, common problems, and quality accidents. Construction quality defects refer to the phenomenon that technical indicators of construction fall short of the allowance of technical standards. Quality accidents refer to the quality damage with larger loss and influence of the safety of

construction structures, functions and form, in the procedure of construction or after delivery for use. The forms of construction quality problems were different and varied, but the reasons can be mainly summarized in the following aspects:

- (1) Problems concerning the construction procedures and regulations
- (2) Problems of design and calculation.
- (3) Substandard materials and products.
- (4) Out of control of construction and management.
- (5) The influence of natural conditions.
- (6) Improper use of facilities.

VII. QUALITY IMPROVEMENT TECHNIQUES

Total Quality Management mainly demands a process of continued improvement aimed at reducing variability. An organization wishing to support and develop such a process needs to use quality management tools and techniques. It is prudent to start with the more simple tools and techniques. These are Check-sheet, Check list, Histogram, Pareto Diagram, Cause-and-Effect Diagram (Fishbone Diagram), Scatter Chart and Flowchart

1 Check-sheet

Check-sheet is used to record events, or non-events (non-conformances). They can also include information such as the position where the event occurred and any known causes. They are usually prepared in advance and are completed by those who are carrying out the operations or monitoring their progress. The value of check-sheet can be retrospective analysis, so they help with problem identification and problem solving.

2 Checklist

Checklist is used to tell the user if there is a certain thing, which must be checked. As such, it can be used in the auditing of quality assurance and to follow the steps in a particular process.

3 Histogram

Histogram provides a graphical representation of the individual measured values in a data set according to the frequency of occurrence. It helps to visualize the distribution of data and there are several forms, which should be recognized, and in this way they reveal the amount of variation within a process. It should be well designed so that people who carry out the operation can easily use them.

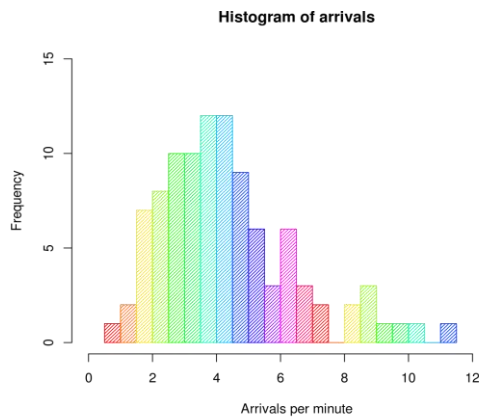


Fig Showing Histogram

4 Pareto Analysis

It is a technique employed to prioritize the problems so that attention is initially focused on those, having the greatest effect. It was discovered by an Italian economist, named Vilfredo Pareto, who observed how the vast majority of wealth (80%) was owned by relatively few of the population (20%). As a generalized rule for considering solutions to problems, Pareto analysis aims to identify the critical 20% of causes and to solve them as a priority.

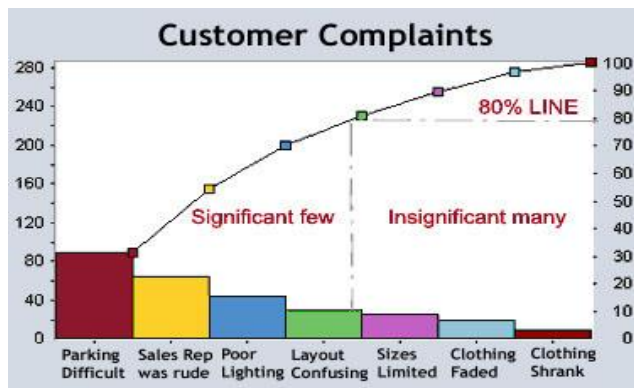


Fig Showing Pareto Analysis

5 Cause and Effect Diagram (Fishbone Diagram)

Cause and Effect Diagram, which was developed by Karo Ishikawa, is useful in breaking down the major causes of a particular problem. The shape of the diagram looks like the skeleton of a fish. This is because a process often has multitude of tasks footing into it, any one of which may be a cause. If a problem occurs, it will have an effect on the process, so it will be necessary to consider the whole multitude of tasks when searching for a solution.

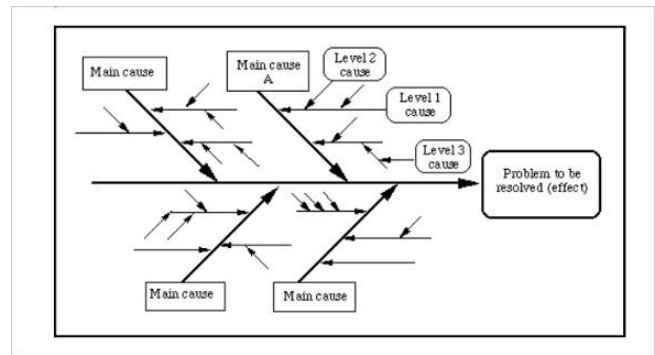


Fig Showing Fishbone Diagram

6 Scatter Diagram

The relationship of two variables can be plotted in the scatter diagrams. They are easy to complete and obviously linear pattern reveals a strong correlation.

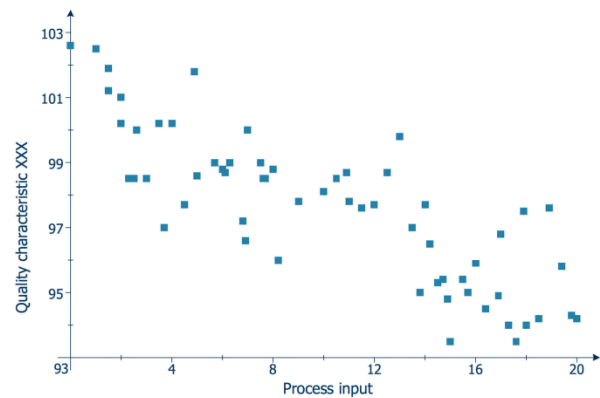


Fig Showing Scatter Diagram

7 Flowcharts

Flow chart is used to provide a diagrammatic picture using a set of symbols. They are used to show all the steps or stages in a process project or sequence of events. A flowchart assists in documenting and describing a process so that it can be examined and improved. Analysing the data collected on a flowchart can help to uncover irregularities and potential problem points.

8 Statistical analysis

Statistics is the study of the collection, organization, analysis, interpretation and presentation of data. It deals with all aspects of data, including the planning of data collection in terms of the design of surveys and experiments.

9 PDCA cycle

PDCA is an iterative four-step management method used in business for the control and continuous improvement of processes and products. It is also known as the Deming circle/cycle/wheel, Shewhart cycle, control circle/cycle, or plan–do–study–act. Another version of this PDCA cycle is OPDCA. The added "O" stands for observation.

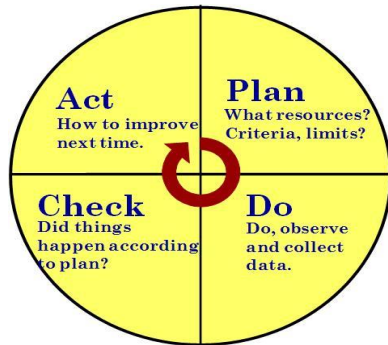


Fig Showing PDCA cycle

10 Pilot survey

A brief preliminary survey, often using a small, convenience sample, conducted to test the survey instruments and data collection method before the project details are finalized and the larger, formal survey conducted.

VIII. QUALITY SYSTEM DESIGN

A quality system is composed of the standards and procedures that are developed to ensure that the level of quality desired is repeated in every unit of a product or service.

The eight steps of the design process are:-

1 Understand and map all business structures and processes.-This forces employees involved in designing a performance measurement system to think through and understand the entire organization, its competitive position, the environment in which it operates, and its business processes. This will also allow for complete understanding of customer touch points and how the different operations in the organization affect the customer' perception of quality.

2 Develop business performance priorities.-The performance measurement system should support the stakeholders' requirements from the organization's strategy through to its business processes. This order of priorities must be in place well before the process enters the actual design phase.

3 Understand the current performance measurement system:-Every organization has some kind of measurement system in place. For this reason, there are basically two ways to approach the design and implementation of a new performance measurement system. Either scrap the old system and introduce a new one as a replacement, or redevelop the existing system. Both approaches can work, but the former approach is more likely to lead to trouble. People will cling to the old measurement system and either use both systems simultaneously or use the old one and simply go through the motions of the new one.

4 Develop performance indicators:-The most important element of a performance measurement system is the set of performance indicators you will use to measure your organization's performance and business processes. This is the point in the design process where the top-down approach meets the bottom-up design approach and where the broad masses of the organization become involved. The purpose of this step is to develop the performance measurement system with an appropriate number of relevant and accurate performance indicators.

5 Decide how to collect the required data:-Developing perfect performance indicators that will tell everything ever wanted to know about what goes on in organization is one thing, but being able to collect the data required to calculate these performance indicators is a completely different matter. This issue must initially be addressed during the development of the performance indicators so that you avoid selecting those that can never actually be measured. There will be trade-offs of cost and time versus the benefits of collecting data, but a likely middle ground between perfect data/high cost and no data/no cost will be found.

6 Design reporting and performance data representation formats:-In this step, decide how the performance data will be presented to the users; how the users should apply the performance data for management, monitoring, and improvement; and who will have access to performance data. After you finish, should have a performance measurement system that has a solid place in your organization's overall measurement based management system.

7 Test and adjust the performance measurement system:-first attempt at the performance measurement system will probably not be perfect—there are bound to be performance indicators that do not work as intended, conflicting indicators, undesirable behaviour, and problems with data availability. This is to be expected. In this step, extensively test the system and adjust the elements that do not work as planned.

Implement the performance measurement system:-Now it's time to put your system to use. This is when the system is officially in place and everyone can start using it. This step involves issues such as managing user access, training, and demonstrating the system.

quality of their processes. "The pressure for companies to become ISO 9000-certified is absolutely increasing and will continue to increase," predicted one management consultant in an interview with Nation's Business.

IX. CONCLUSION

Quality management is the technique to improve the quality of construction project. this is easily possible with using quality improvement techniques. quality assurance is most important factor for perfection of construction project. while working on quality, it should be consider about characteristics of quality for better results. quality management is one of the most important tool for success of construction business.

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