Study On Quality Management In Construction

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Abstract- *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. The research based on QMS recommended that construction companies should create a flexible and conducive organizational atmosphere which encourages the development of quality management system in all aspects of their work. The questionnaire survey has been carried out in the present study by taking interviews of participants of project. The participants of project include owner/builder, project management consultant, contractor, various consultants and suppliers. The questionnaires have been prepared by authors based on quality aspects in construction project for builder / contractor, consultants and customers / occupants of buildings. This paper describes the analysis of data collected during interviews & questionnaires with builder / contractor.*

I. INTRODUCTION

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. Consequently, additional investments are required for removal of defects and maintenance work. A construction project in its life span goes through different phases. The main phases of a project can be described as: conceptual planning, feasibility study, design, procurement, construction, acceptance, operation and maintenance. For the implementation of quality management in construction projects, the concepts of quality planning (identification of quality standards), qualityassurance (evaluation of overall project performance) and quality control (monitoring of specific project results) in the quality management processes were defined by Project Management Institute (2000). Several tools and techniques were identified as part of the implementation process, like benefit-cost analysis, benchmarking, flow-charting, design of experiments, cost of quality, quality audits, inspection, control charts, pareto diagrams, statistical sampling, flow-charting and trend analysis.

II. LITERATURE REVIEW

David Arditti, et al (1997) stated that there is capacity for improvement of quality in the field of construction and author explained total quality management (TQM). Total quality management (TQM) aims at best team work and co-operation, and not only for the meeting and dispute, it is long life for the construction industry.

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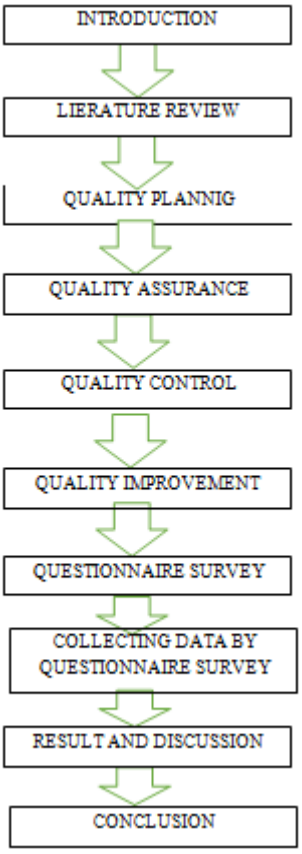
III. METHODOLOGY



IV. QUALITY PLANNING

Quality planning should include decisions regarding actions required to meet quality requirements and the planned quality actions often entail the use of specific QA and QC techniques. The QA and QC techniques therefore need to be decided upon during quality planning. In the case of projects to develop new systems, Project Quality Planning involves decisions regarding.

It is important to note that quality activities should form a well-integrated part of the overall project plan. They are not being planned in isolation by some quality manager, but rather by the whole project management team. Quality activities are also typically executed by the majority if not all of the project team members, not just by staff from a Quality Division.

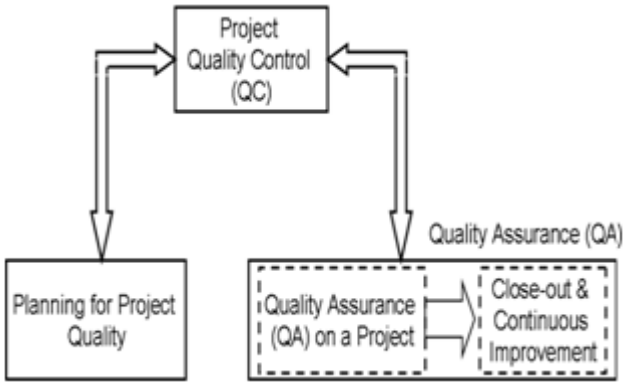
Project quality management is the process through which quality is managed and maintained throughout a project. While the context may imply that "quality" means "perfection," in this case, is usually more about ensuring quality consistency throughout a project. However, what is exactly meant by "quality" is beholden to what the customer or from the project.

V. QUALITY ASSURANCE

QA is not only required on each individual project to ensure compliance with requirements, a second element is inter-project continuous improvement that is facilitated by systematic project close-out. Hence, in a project environment, QA consist of Project Quality Assurance Plus Continuous Improvement. While QA on a project is concerned with a specific project only, continuous improvement improves the organizational competence to manage projects and advances the maturity of project quality management.

Checklists are often used to record perceived quality risks and quality problems that had been experienced on prior projects.
Tools for close-out and continuous improvement include:

- Project close-out meetings where lessons learned are acknowledged and documented
- Close-out meetings of project phases, similar to the final project close-out meeting
- Reports resulting from the close-out meetings
- Tools used in the Quality Assurance Process. There are fundamentally three tools utilized in quality management.
- High quality output
- Eliminate waste or in the very least minimize waste
- Increase the efficiency of operations by a large factor
- Offer customer satisfaction, which positively affects your brand and helps individuals and organizations grow their business
- Less rework and after-sale support is needed.



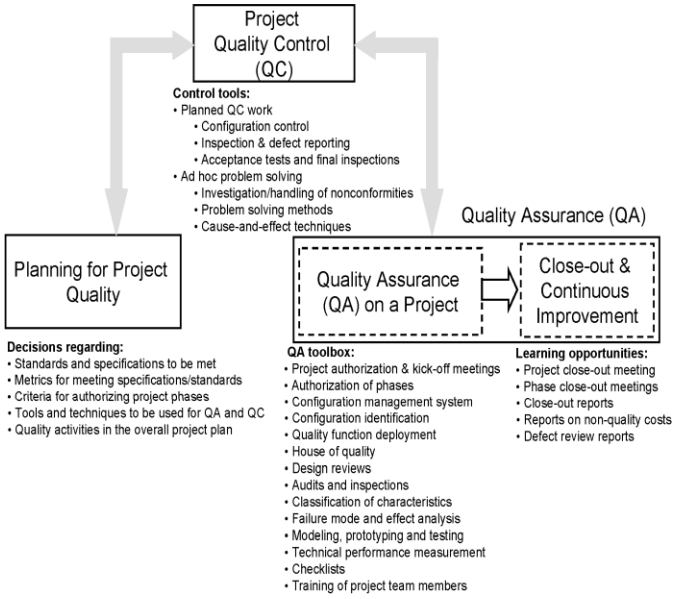
VI. QUALITY CONTROL

Two facets of project quality control are planned QC work and ad hoc problem solving. Planned QC work consists of activities that can be planned to a relative level of detail beforehand. Ad hoc problems are obviously unforeseen hitches, and contingency reserves in budgets and schedules should make provision for activities to investigate and rectify such problems. QC activities include.

Ad hoc problem solving includes the investigation and handling of all nonconformities that are discovered and includes a variety of problem-solving methods. Ishikawa diagramming is a cause-and-effect technique commonly referred to in project quality management literature. It should however be noted that at least two other types of cause-and-effect diagrams exist, namely causal loop diagrams and current reality trees. The Ishikawa diagram is the simplest of the three types and is often adequate to analyze a simple quality problem. As the name indicates, causal loop diagrams make provision for complexities of loops of causes that affect one another positively or negatively. Causal loop diagrams are used in computer simulations of complex problems.

VII. SCOPE OF QUALITY CONTROL

1. To discover flaws or variations in the raw materials and the manufacturing processes in order to ensure smooth and uninterrupted production.
2. To evaluate the methods and processes of production and suggest further improvements in their functioning.
3. To study and determine the extent of quality deviation in a product during the manufacturing process.
4. To analyse in detail the causes responsible for such deviation.
5. To undertake such steps which are helpful in achieving the desired quality of the product.



VIII. QUALITY IMPROVEMENT

Basics of Quality Improvement Quality improvement (QI) is a **systematic, formal approach to the analysis of practice performance and efforts to improve performance**. A variety of approaches or QI models exist to help you collect and analyse data and test change.

Quality Management, a relatively recent phenomenon ensures that an organization, product or service is consistent with quality. It is based on both prospective and retrospective reviews. However, the scope of Quality management is not just limited to product or service quality but also deals with the means to achieve and maintain quality standards. Thus, Quality Management may be defined as an act of performing all the activities and tasks which are needed to maintain a desired level of excellence.

Quality costs consist of the cost of prevention, the cost of appraisal, and the cost of deviation. Prevention costs are those resulting from activities used to avoid deviations or errors, while appraisal costs consist of costs incurred from activities used to determine whether a product, process, or service conforms to established requirements.

IX. DATA COLLECTION SURVEY

Data collection and analysis tools are defined as a series of **charts, maps**, and **diagrams** designed to collect, interpret, and present data for a wide range of applications and industries. Various programs and methodologies have been developed for use in nearly any industry, ranging from manufacturing and quality assurance to research groups and data collection companies.

PRELIMINARY STUDY

Quality management ensures that an organization, product or service is consistent. It has four main components: quality planning, quality assurance, quality control and quality improvement. Quality management is focused not only on product and service quality, but also on the means to achieve it. Quality management, therefore, uses quality assurance and control of processes as well as products to achieve more consistent quality.

DESIGN OF QUESTIONNAIRES

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

RESULTS OF THE QUESTIONNARE SURVEY

Considering the significance of quality management in the design and construction stage, it is important to study this issue in the construction industry of India. In order to achieve this objective a questionnaire survey was carried out in two major cities of India. The main participants of the survey were design consultants and contractors. The study of design stage is based on the data collected from design consultants and the study of construction phase is based on the data collected from contractors. Total 35 Questionnaires were distributed to consultants and contactors. 10 companies responded to the questionnaire. Out of 10 respondents were contractors and 25 were design consultants.

X. RESULT AND DISCUSSION

CONTRIBUTION OF QUALITY MANAGEMENT AT THE DESIGN SITE

Contribution of Quality Management at the Design Stage: As depicted in 2, 12 out of 25 respondents are of the opinion that quality management at the design stage may contribute up to 75% of the quality of the product/service. Approximate Percentage of Design Errors Observed by Consultants During Design Phase of the Project. out of companies observe 10% errors at the design stage of the project.

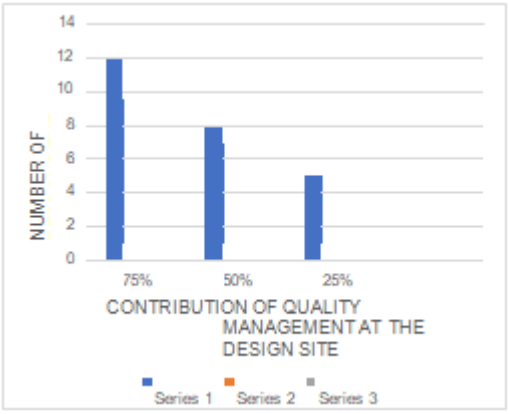


Figure.1.1 CONTRIBUTION OF QUALITY MANAGEMENT AT THE DESIGN SITE

FUTURE PLAN TO IMPLEMENT, CHANGE OR MODIFY QUALITY MANAGEMENT SYSTEM

Future Plan to Implement, Change or Modify Quality Management System: As shown in Fig. 5.3, majority of the respondents is satisfied with their existing quality management procedures and only few have the plan to modify or change their existing quality management procedures.

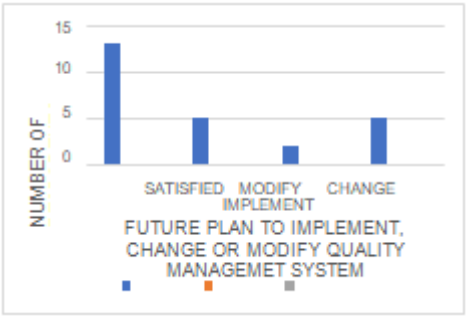


Figure.1.2 FUTURE PLAN TO IMPLEMENT, CHANGE OR MODIFY QUALITY MANAGEMET SYSTEM

APPROXIMATE PERCENTAGE OF DESIGN ERRORS OBSERVED BY THE CONSULTANTS DURING DESIGN STAGE

Approximate Percentage of Design Errors Observed by Consultants During Design Phase of the Project companies observe 10% errors at the design stage of the project. Approximate Percentage of Design Errors Reported by Contractors During Construction Phase of the Project consultants respond that 10% design errors are reported by the contractors during the execution stage of project.

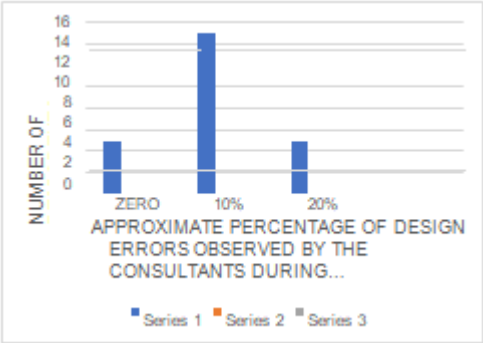


Figure.1.3 APPROXIMATE PERCENTAGE OF DESIGN ERRORS OBSERVED BY THE CONSULTANTS DURING DESIGN STAGE

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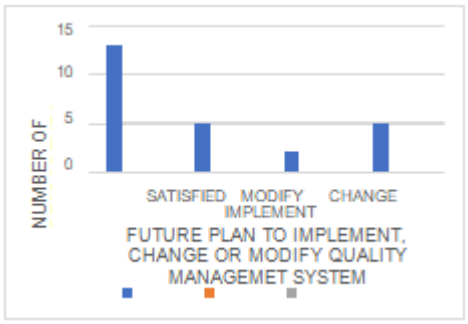

Figure.1.4 FUTURE PLAN TO IMPLEMENT, CHANGE OR MODIFY QUALITY MANAGEMET SYSTEM

XI. CONCLUSION

The results of the survey clearly indicate that both consultants and contractors realize the importance of quality management in the design and construction phase of project. However, there is lack of quality management procedures in the design and construction process. Consequently, the quality of design and construction is affected. Poor quality in design and construction affects the maintenance cost and level of service of the project. Therefore, this paper concludes that the consultants and contractors should take some proactive measures in order to improve the quality in the design and executionphase of construction projects.

REFERENCES

[1] Association for Project Management; Project Management Body of Knowledge, 4th Edition, Cambridge, UK: APM, 2000.

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