

QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS IN SUDAN

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ABSTRACT

This paper (to demonstrate the quality management behavior and its relations with construction management) sector and (also to asset and evaluate the assumed approach).by reviewing the systems and specifications of the construction industry in Sudan, and introducing the concept of quality and its applications in construction projects. Accordingly, a questionnaire was designed inquiring about the current status of quality management in construction projects

in sudan.

KEYWORDS: Quality management, TQM, Construction, Questionnaire.

1. INTRODUCTION

During the past twenty years, (there has been revolution in the management industry within all its department to new aspects) Unfortunately, (in some occasions but not mostly when projects fault. (such an unfortunate situation leads the companies to enhance their management system with recognition to the new aspects of quality management benefits to avoid such accidents), willingly to meet the quality improvement final scheme).

Most engineering companies have not fully realized the relationship between project management and total quality management until they see that their market share was declining negatively.

Literature review

We can define Quality as the degree to which the project and its components meet the owner's expectations, objectives, and intended purpose. Or that determines the extent to which the project conforms to the plans and standards in force.^[1]

Quality management means the process of planning organizing, implementing, monitoring, and documenting a system of management practices that coordinate and direct relevant project resources and activities to achieve quality in an efficient, reliable, and consistent manner.^[1]

The concept of total quality management (TQM)

There is on a great definition of total quality management, and it was the first attempt by the British quality organization as (the management philosophy of the institution, through which all consumer needs can be achieved as well as the achievement of project goals together). Indicates and guides the organization to achieve and continuous development under the framework of human resources that improve the use of available resources and to achieve the needs of current and prospective consumers.^[2]

As mentioned in (PMPOK)^[3] about project quality management is meeting the owner's needs as described in the contract requirements and is an integral part of risk management, safety and environmental management, for construction projects, project quality management manages both the process and the product. Project quality management is critical to all projects, with serious implications for construction projects. The planning operations group reviews construction documents that define quality standards required to be met for project success, including contracts, construction documents and specifications. The implementation process group discusses quality compliance audits and technical quality reviews that it may require licensed or certified professionals to achieve project requirements and objectives.

Total quality management in construction projects goes through several basic stages, and several steps were mentioned in each stage that must be followed to ensure quality, for example but not limited to.

1-Quality definition stage

It is through preparing the preliminary study for the project and making the decision to implement the project:

- Develop a plan for the initial costs of the project before starting the design.
- Choosing a project manager before deciding to start a project.

2- Quality characterization stage

It is during project design:

- Choosing the entity that designs on the basis of the technical design as well as the price.
- Proofreading the study (design) on the other hand.

3- Quality Assurance phase

It is during the preparation for the implementation of the project (selection of the contractor and import of materials)

- Choosing a contractor based on experience and competence as well as price.
- Providing the materials and equipment needed for construction in a timely manner.
- Ensure by the owner or supervisor that the materials and equipment supplied to the project meet the required conditions and specifications.
- Suppliers are selected on the basis of experience, competence as well as price.

4- Quality control stage

- It is carried out during the project implementation stages and is an evaluation of the operations on the site and the extent of completion.
- The existence of procedures and legal clauses within the contract that obligate the contractor to the terms and technical specifications of the project during implementation.
- The control carried out by the owner or supervisor during the implementation ensures the accuracy and correctness of the implementation.
- Contracts must stipulate the establishment of periodic meetings to coordinate between the project parties (owner, designer, supervisor, executor) and obligate each party to evaluate all necessary details and clarifications for the rest of the parties.
- The parties implementing the project must be trained and know what their tasks and responsibilities.

5- Quality verification stage

- It takes place during the receipt of the project (assessment of the receiving process):

- That the project be completed on time.
- It is ensured that the work is carried out with the necessary accuracy before starting to use the project.
- The executor is obligated to correct the defects discovered before starting operation and investment.
- The executor is destroyed by correcting defects that appear in the first period of startup.

6- The stage of maintaining quality

It is the last stage, and it is when the actual use of the project and the necessary and immediate maintenance work.

- The facilities are used and operated properly by the investor.
- The presence of permanent supervision of the establishments during their investment.
- Conducting periodic maintenance of facilities during their investment.

2. The importance of research

Applying the scientific foundations of quality management in the construction industry and reaching a set of proposals and recommendations that aim to improve in the construction industry.

3. METHODOLOGY

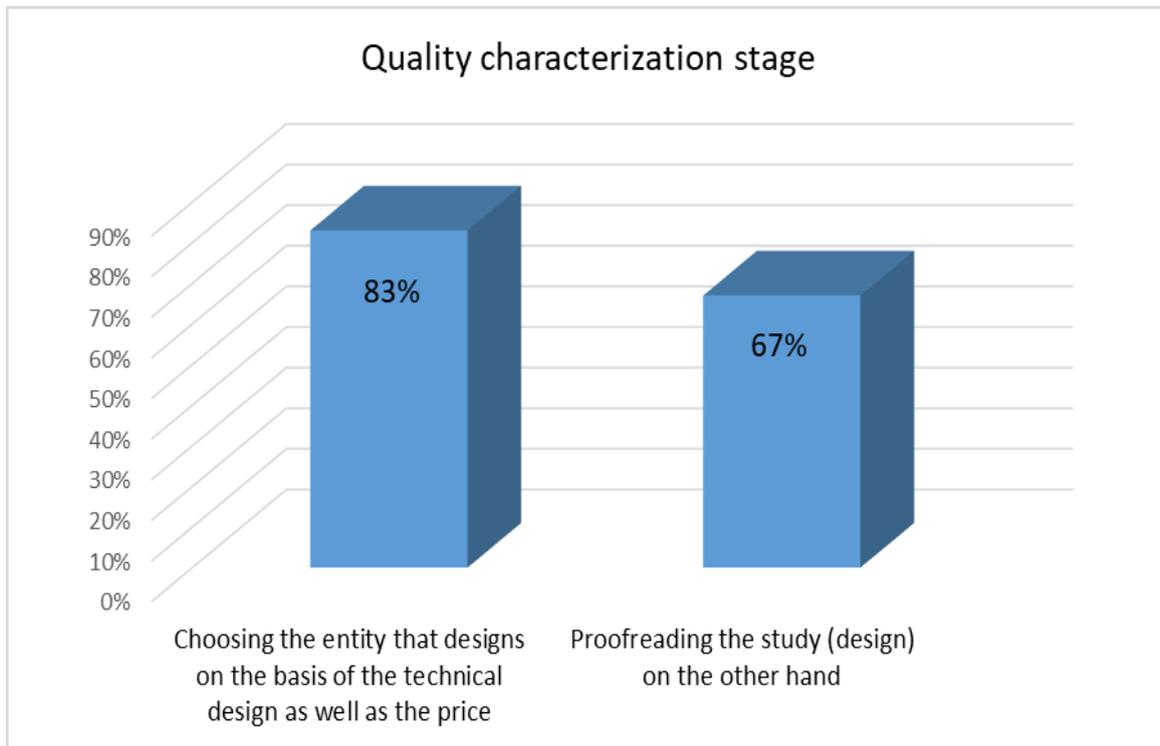
Following the descriptive approach to know the concept of quality and the stages of quality management in construction projects by designing a questionnaire and distributing it to specialists in the field of construction. The data collected from the questionnaire was analyzed to interpret the results obtained and compared them with the steps followed in total quality management to reach a set of recommendations aimed at upgrading the construction industry.

4. RESULTS

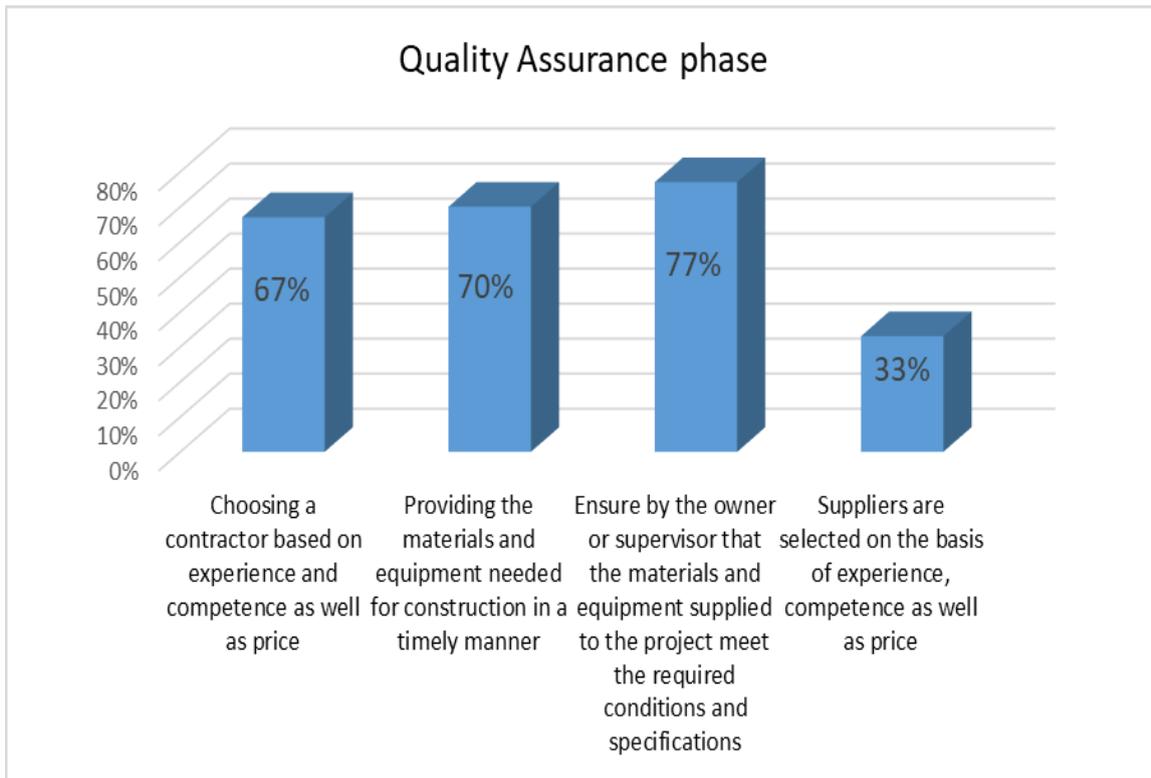
The questionnaire was analyzed and results were obtained regarding the steps that were mentioned, (for example), followed in total quality management in construction projects, and the results were as follows.



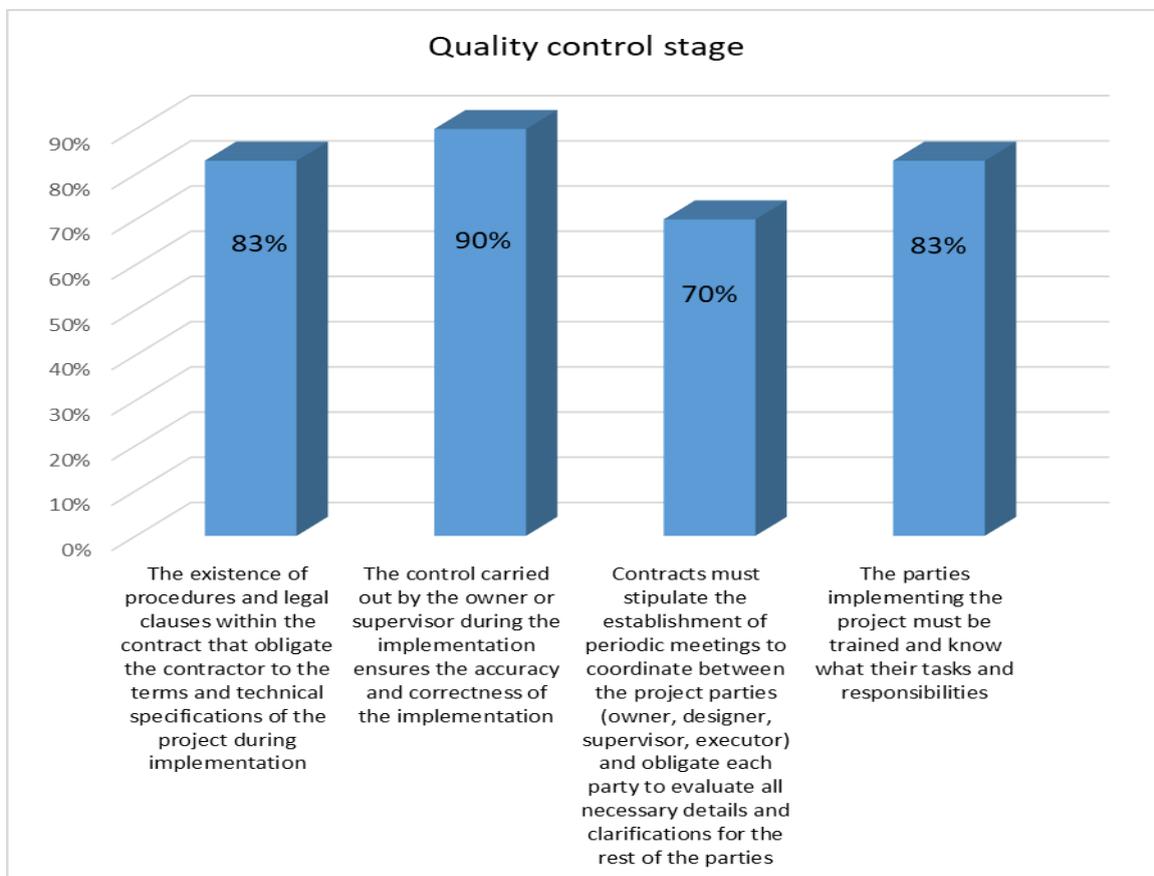
Quality definition stage



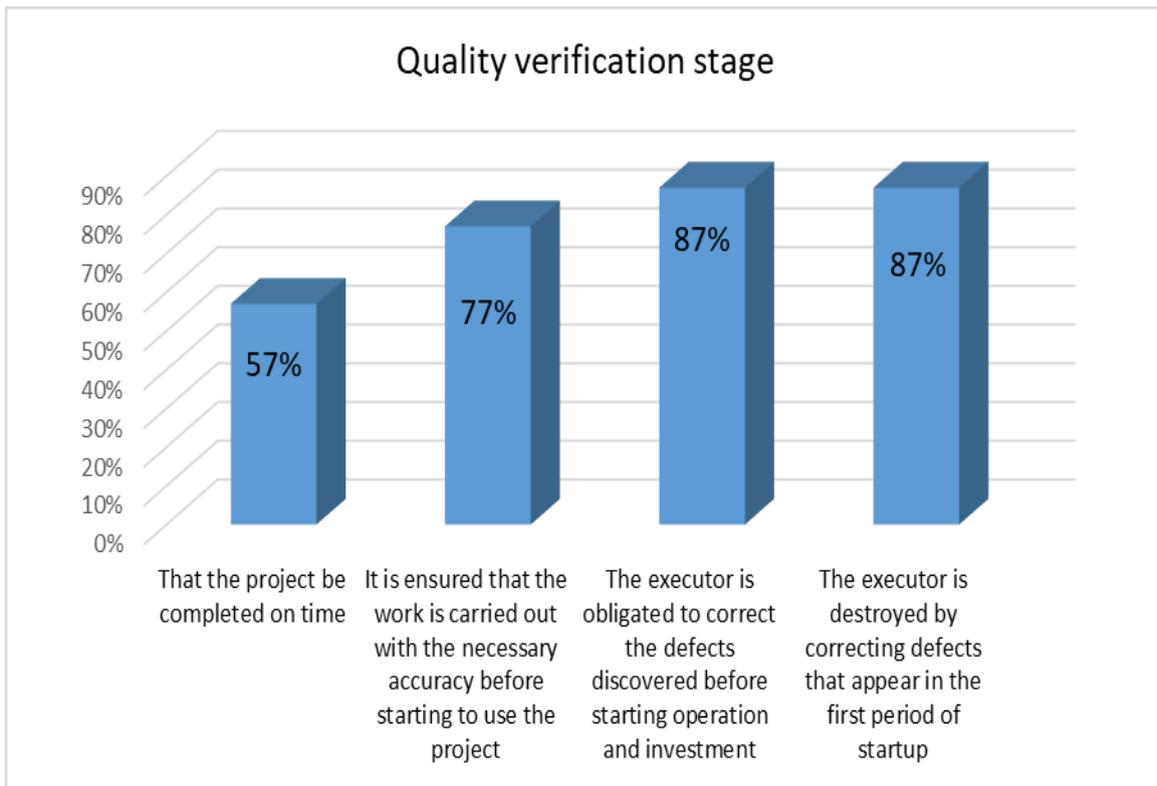
Quality characterization stage



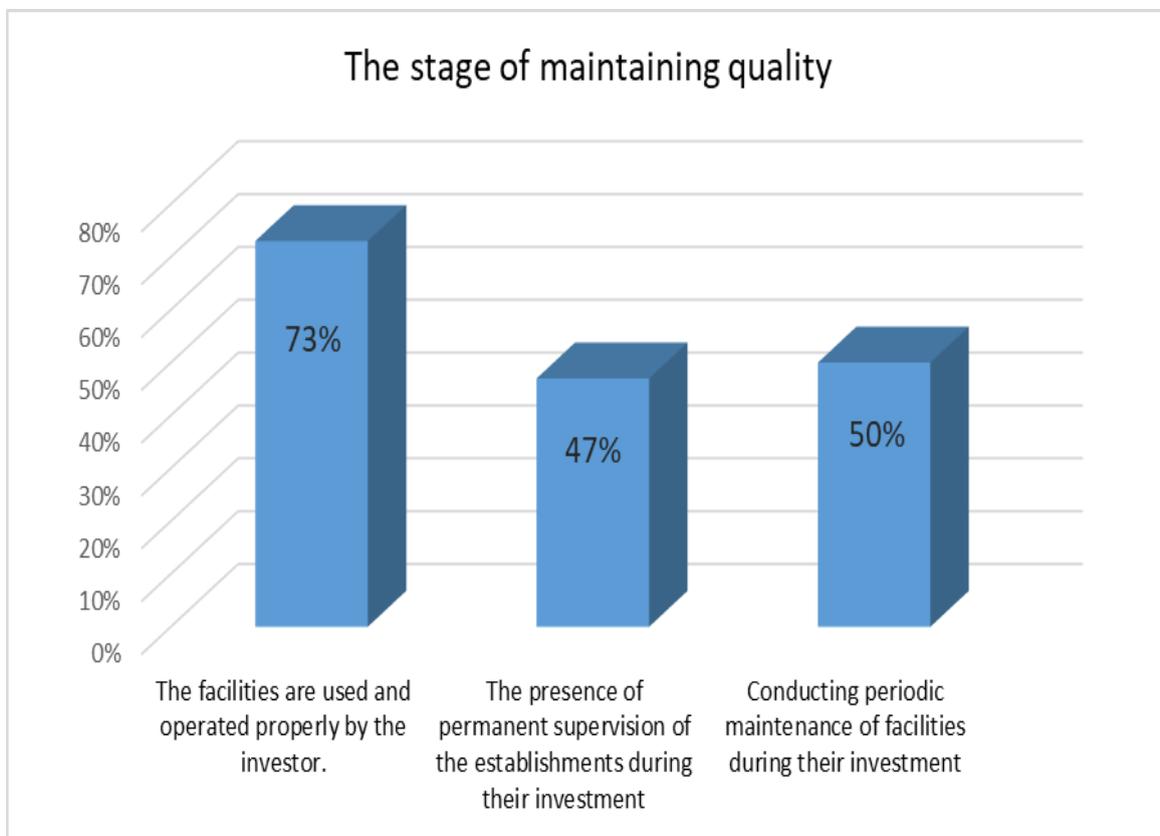
Quality Assurance phase



Quality control stage



Quality verification stage



The stage of maintaining quality

5. DISCUSS THE RESULTS

- From the first figure in the quality definition stage, 93% of the construction companies in Sudan develop a plan for the initial costs of the project before starting the design. Likewise, 73% of them choose a project manager before deciding to start a project.
- And in the second figure, in the quality characterization stage 83% choose the entity that designs on the basis of the technical design as well as the price, and 67% review the study (design) on the other hand.
- The third figure shows in the quality Assurance phase 67% choose a contractor on the basis of experience and competence as well as price, 70% provide the materials and equipment needed for construction in a timely manner, in 77% of the companies it is confirmed by the owner or supervisor that the materials and equipment supplied to the project meet the required conditions and specifications, and 33% of suppliers are selected on the basis of experience, competence as well as price.
- In the fourth figure in the quality control stage, 83% of the companies there are procedures and legal clauses within the contract that obligate the contractor to the technical specifications of the project during implementation, 90% are monitored by the owner or supervisor during the implementation period, which ensures the accuracy and validity of the implementation, and in 70% of the companies the contracts provide for the establishment of periodic meetings to coordinate between the project parties (owner, designer, supervisor, executor) and obligate each party to evaluate all necessary details and clarifications for the rest of the parties, and in 83% it is required that the parties executing the project must be trained and aware of their tasks and responsibilities.
- The fifth figure appears in the quality verification stage, 57% of companies complete the project on time, in 77% of them it is ensured that the work is carried out with the necessary accuracy before starting to use the project, in 87% the executor is obligated to correct the defects discovered before the start of operation and investment, 87% the executor is obligated by correcting defects that appear in the first period of startup.
- And in the last figure in the stage of maintaining quality, 73% confirmed the use and operation proper of the facilities by the investor, and 47% indicated that

there is permanent supervision of establishments during their investment, and 50% carry out periodic maintenance of facilities during their investment.

6. CONCLUSION AND RECOMMENDATIONS

The study found

- There is an understanding by the engineering companies of the meaning of quality, its objectives and standards, and there is a conviction of the system, but it is not interested in applying it in the optimal form.
- In the quality assurance stage, most companies are interested in selecting suppliers based on price and not on experience and efficiency.
- It was noted that in the quality verification stage in most cases the project is not completed on time, which reduces customer satisfaction and gives a sense of lack of credibility and this reduces quality.
- As for the completion of the project delivery, the supervision of the facilities during their investment is weak, and there is little interest in conducting periodic maintenance for them.

Recommendations

- Spreading the concepts of total quality management by using specialized expertise.
- Introducing the total quality system into the teaching curricula and colleges of higher education.
- Increasing scientific research activity to determine the size of the gap between quality requirements and the reality of the construction industry in Sudan.
- Setting standards and creating competitive competitions between construction companies in Sudan.

7. REFERENCE

1. Construction management standards of practice (2010 Edition).
2. Construction quality management (principles and practice) second edition. (Tim Howarth and David Greenwood).
3. Construction Extension to the PMBOK GUIDE.
4. Barrie, Donald S and Paulson, Boyd C. Jr (1978) professional construction management, McGraw-hill, Inc.
5. Chartered Institute of Building (1989) Quality assurance in the building process.

6. Oberlender, Garold “project management for engineering and construction “civil engineering series.
7. Jaim prof K.C and chitale. Prok. A.K (1998) Quality assurance and total quality management, KHANNA Publishers.