Analysis of the Impacts of Quality Assurance and Quality Control on Construction Projects using RII method

1,⁎Muhammad Marafa Ribah, 2 Harkamal Singh
1&2Department of Civil Engineering, Lovely Professional University Punjab India

ABSTRACT: Quality control and quality assurance are important parts of a quality management system, therefore quality planning, quality assurance, and quality control are all part of a quality management system in the construction sector. There are numerous approaches to put into effect for a quality management system in the construction business, which can be done at the company or project level. The motive of this work is to analyze the influence of quality control and quality assurance on building projects by using the RII method of analyses so as to know the relative importance of different factors critical to quality in construction. At the initial stage of this research a questionnaire was developed with thirty seven factors grouped into five groups 153 questionnaires were distributed to professionals and skilled workers in various construction sites belonging to different construction companies within the study area while 136 were returned, data obtained from respondents was analyzed by the use of the statistical package for social science (SPSS) after which the RII method was used to identify the relative importance of the various factors. The impact of various factors were discussed and recommendations were made. The case study area is construction sites in Kebbi state Nigeria. Therefore data obtained was statistically measured and analyzed accordingly.

Keywords: Quality Assurance, Quality Control, Construction Project

1 Introduction

For many years, the building sector has been preoccupied with the question of quality, which has had a significant impact on the economy. The effect could have been considerably decreased if the industry has adopted QA/QC because many other areas of the economy have embraced the notion of quality assurance with tremendous success (Sahil and Samiksha 2020). In the construction sector, quality control (QC) and quality assurance (QA) are critical and cannot be overstated, as they play a critical role in preventing flaws or failures in building facilities that can be costly.

⁎Corresponding Author: sparkmarafa@gmail.com,
Quality control is a management activity that establishes objectives for construction projects. The target is to achieve a predetermined performance and cost requirement in this situation. To get the top quality at the lowest cost, we must examine the factors that influence a product or service's quality. (2020, Sahil and Samiksha).

For project managers, quality control and quality assurance are becoming increasingly important factors according to (Sahil and Samiksha 2020). They went on to say that, every construction project needs quality assurance and quality control since they serve to enhance the project's standard and uniformity. Quality planning, training, clear decisions and directions, regular monitoring, rapid inspection of completed tasks for accuracy and completeness, as well as documentation of all resolution, presumption, and findings are all essential and are all part of the quality control process. Quality assurance is the adoption of proactive processes aimed at preventing problems, (Sahil and Samiksha 2020).

According to Abdulkareem and Adeoti (2010), there are acknowledged areas of concern in construction sector that have an impact on quality, such as a high prevalence of inadequate supervision of engineering projects by individuals involved, which has resulted in building collapses. Other is a growing public awareness that huge construction works have a considerable influence on the economy, the standard of living, and welfare of society, and are thus viewed as a national public interest problem.

However, most researchers who conducted research on the subject focused on putting in place a quality management system and its effects, rather than considering the causes of non-implementation and the barriers involved. They also failed to discover how clients and customers define quality from their own perspective, as opposed to the conventional definition. As a result, this study will concentrate on the discrepancies found.

1.1 Statement of Research Problem
Because of major changes, innovation, and high user in recent years, expectations, as well as the need for QA and QC in construction projects, have greatly improved. Quality Control and Assurance procedures, may not be correctly conducted to meet user requirements and are sometimes not properly planned (Lakshmi 2015).

1.2 Need for Research
Laboratory tests on composite materials, testing of materials to used, adequate understanding of materials and skills, and regular precautions are all examples of quality control. The materials that will be used meet all of the requirements. According to (Sahil and Samiksha, 2020), an important step toward enhancing job quality is to make certain that all materials and fixtures are in good working order utilized in the project comply with the contract's specifications. However, QA and QC assure consistency in the entire work and more efficient material consumption, resulting in significant cost savings for customers.

1.3 Aim
Purpose of this research work is to assess the value of Quality Assurance and Quality Control implementation, as well as analyzing all elements that influence Quality Assurance and Quality Control Management, as well as their implications for building projects.

1.4 Objectives
i. To determine the impact on construction projects of noncompliance with quality assurance and quality control criteria.
ii. To determine how unanticipated changes or conditions that may affect construction quality can be addressed during the construction process.
iii. To offer methods for implementing quality assurance and quality control on building projects.
1.5 Research Questions

To aid researcher, study questions were devised in carrying out this study viz:

i. Do Nigeria's construction industries commit to quality management plans during project execution in order to deliver structurally sound structures?

ii. Do Nigerian construction industries face hurdles in their efforts to adhere to quality assurance during project execution?

iii. Does quality assurance affect the long-term durability of built structures?

iv. How can we ensure that the construction industry adheres to the already established national and international building standards?

v. How do quality assurance and quality control techniques effect building projects?

vi. What frameworks exist for forecasting whether quality control and quality assurance innovations in the Nigerian construction sector will fail or succeed?

1.6 Scope of Study

Goal of this work is to study Quality Assurance and Quality Control techniques on construction projects in Kebbi State, Nigeria, as well as the implications they have on building structures in general. For the purposes of this study, the scope will be limited to the aforementioned topic and will not extend beyond that scope in order to maintain objectivity and the researcher's capacity. The research will look into a variety of elements that influence building project quality. Interviewing and delivering questionnaires to various specialists and people in the construction business will also be part of scope.

2. Literature Review

According to Mane & Patil (2015), among the principal criteria in the fortune of building projects is quality. The quality of a construction project, like the accomplishment of a project, can be described as matching the supposition of project partakers (i.e. contentment). According to the study's findings, check lists are utilized as a quality tool, quality control, and quality assurance methods in building projects, and they should be given due attention to customer satisfaction.

2.1. Definitions of Quality

The extent to which a product may match specified standard and constraints set by the construction agency is known as quality. This examination guarantees that the work is of sufficient quality and durability. Inspections may be carried out from the point of material delivery all the way to the finished product to achieve this. Earlier and during the building process, important issues of control include soil quality verification, drawings and designs, structural safety, durability, checking the quality of materials, requirements, material testing, and equipment investigation. (Sahil and Samiksha, 2020).

2.2. Quality Dimensions

Definitions of different quality are required; relying on one definition use to bring complications. 'David Garvin's eight key quality dimensions' may explain the wide range of classifications (Evans & Lindsay, 1992), Abusa (2011), Abu Bakar et al. (2011) Amer (2002), Rabaya (2013), , and presented these aspects in the following way:

1. Performance: The key operational qualities of a product, such as machine speed clarity, are its primary operational characteristics.


3. Reliability: the likelihood of a product surviving under defined conditions for a specified amount of time.
4. Conformance: the extent to which products conform to set norms; this aspect takes into account objective metrics that are unaffected by consumer desires, hence specifications are limited.

5. Durability: the amount of time a product may be used before it becomes physically deteriorated or until it is desirable; it indicates the amount of time the product can be used before it needs to be repaired.

6. Serviceability: it is an essential factor which confirms to quality assurance system and ISO. It is determined by the speed with which repairs are completed and the courtesy with which the repairperson is treated.

7. Aesthetics: the way it appears, functions, sounds, tastes, or smells; a building's external finishes are an example.

8. Perceived quality: a personal judgement based on an image, advertising, or brand name, thus advertising must employ modern tactics.

2.3 Quality Management (QM)

All management-related activities operations, specifically, high management leadership that establishes quality policies goals and duties. Quality management refers to the process of ensuring that all members of an organization meet certain standards. It consists of all activities handled by management for them to execute their quality policy (Abusa, 2011). O Z Oni, et al. (2019), indicated that the major factors which affects quality management on construction sites among either private or public companies, were lack of laid down sanctions by the government to organizations on not making use of the National Building Code, inadequate supervision of work at each stage, giving out contract to uncertificated contractor, in availability of good construction quality control program.

2.4 Quality Assurance in Construction

Contractors view customer happiness, management dedication to excellence, repeat business, and a knowledgeable workforce to be the top measures of quality, according to (Hoonakker, Carayon, and Loushine 2010). They claim that the most commonly connected aspects with quality are contractors' own judgments of quality and client satisfaction. It's less vital to follow design codes and warranties.

2.5 Quality Control in Construction

In the construction sector, quality is referred to as client satisfaction and attaining their needs within a specified budget. Quality control, on the other hand, is the process of inspecting the completed facilities to ensure that it is done on a regular basis they satisfy contract's specifications. A team of owners’ engineers/consultants normally carries it out. The owner's selection of advisors, led by an architect, is the first step in quality control. Quality control is viewed as the client's responsibility, as he or she determines the project's standards and desires. Quality control is an aspect of quality management that assures that products and services fulfill requirements. McCownGordon Construction, (2021). For example, claims that Quality control is a management system that focuses on construction quality, such as a completed building structure or a restored space that is not leaking and has finishes that age well and survive the test of time. For building quality to be attained, the implementation process will not be just the duty of a construction company's associates, but will also include trade partners such as artisans and craftsmen who will be putting the work in place. Even though most businesses have quality control procedures, not all of them go beyond the bare minimum.
2.6 Quality Control Requirements

Good planning, training, straightforward judgments and orders, and frequent inspection, quick inspection of finished tasks for completeness and precision, and recording of all judgements, expectation, and suggestions are all part of quality control.

Quality Control, Quality Assurance, and Quality Improvement are all aspects of quality management. (Mohammed and Abdullah 2006).

![Construction Project Quality Management Diagram]

Figure 2.0: Approaches to conformance in Quality Management


A hard quality tools, mixing methods, and soft methods are three basic categories of quality tools and procedures that support quality programs. Hard quality instruments include standardized quality systems, written quality systems, quality pricing, control charts, and statistical sample criteria. Reviewing action plans, the flexibility of the structure of the company, its control charts, quality circles, and quality planning tools are all examples of mixing approaches. Training, customer fulfillment surveys, continuous interaction with suppliers and outside parties groups, steps to reduce environmental effect, empowerment, self-assessment, and benchmarking are examples of soft approaches.

Quality, like every other aspect of company, must be deliberately controlled at the corporate level. In order to thrive in today's business environment, to gain a competitive advantage, companies must look for ways to increase quality and productivity. (Mohammed and Abdullah 2006).

2.7 Importance of Quality in Building Construction

Quality control is essential to the success of any project, and it should be followed from start to finish, from design to construction and installation. Supervision during the construction process leads to saving of funds in the long term by avoiding costly repairs once the project is completed. Inspectors, engineers, contractors, funding agencies, permission agencies, and employees should carry out the inspection of all relevant papers and give positive advice on faults. The relevance of "Quality Assurance methods" cannot be overstated, as client quality is just as important as cost and construction time (Longtau P. etal2016). In construction of building, quality control is critical to:

i. Improve the aesthetics of the building.
ii. Increase the building's safety and durability reduce faults.
iii. Verify user compatibility.
iv. Meet clients’ requirements and objectives, which will result to a comfortable use of the structure.

Client happiness, consistency in conforming to requirements, and meeting the overall project goals are all ensured by quality in the construction production process. The contractor is primarily responsible for quality control and assurance (Bustani S. and OyemogumM. 2014).
2.8 What is the point of having standards?

Longtau P. et al. (2016). A standard is nothing more than a description of how something should be done. Standards are papers that specify acceptable circumstances or manners, which will serve as a benchmark for ensuring that such situation or manners are met. In most circumstances, Standard establishes minimum requirements (Longtau P.et al. 2016). He further said that the International Organization for Standardization (ISO) has stated the following on the relevance of standards:

i. Makes certain that the environment is in good shape.

ii. Makes certain that people are safe.

iii. Provides a level of trustworthiness.

iv. Ensures interchangeability and

v. Ensures efficiency.

3 Methodology

Methods used in this investigation are discussed here. It contains details on the study's research design, methodologies and procedures, as well as how the population and sample size were determined. It also explains how the questionnaire was constructed, and then shows the way the questionnaire's remains valid and reliable.

3.1 Study Procedures

The major goal of this study, as previously outlined, is to examine the relevance of Quality Assurance and Quality Control practice, as well as to pinpoint various elements impacting Quality Assurance and Quality Control Management and their effects on building projects. As a result, the approach used in this study is divided into two phases, each of which is complementary to the other:

- A preliminary phase in which several sources of knowledge are presented.
- Data collection and statistical processing are presented in the second step, which includes the formulation of questionnaires.

3.2.1 Data Collection

The most important goal of the data collecting phase is to achieve the project's objectives because it is here that the project's key data will be collected. To obtain meaningful data, semi-structured interviews, previous research, and questionnaires are required. The basic data was acquired using questionnaires. It was written up and distributed to people participating in construction projects as well as end customers.

3.2.2 Questionnaire Design

There are five sections to the questionnaire. The respondents' background information is presented in Section A. The respondents were asked to respond to questions on their designation, their profession, working experience on sites, Qualifications of Respondent and their gender. The second part of it inquired on manpower issues affecting QA/QC on construction projects, Section C about machineries/equipment issues affecting QA/QC on construction projects, Section D about management issues affecting QA/QC on construction projects, Section E about funding issues affecting QA/QC on construction projects, and Section F about duration issues affecting QA/QC on construction projects. The survey questionnaire will be prepared with an online survey option in mind to make it easier for respondents to participate. Furthermore, the online survey will save respondents' time, making them less hesitant to complete the survey form.
3.3 Expected Outcome

1. To ascertain the importance of quality assurance and quality control practices on building sites in the research area.
2. To determine the parameter that influence the proper execution of QA/QC in building projects.
3. To assess the consequences of a lack of adequate QA/QC practices in the construction industry, as well as potential solutions.

Books, published master's theses, journals, conference papers, internet, and interviews with professionals within Nigeria construction firms were used to conduct the literature review. A rigorous analysis of the literature was used to identify and categorize the causes of poor QA/QC compliance on construction project.

3.4 Ishikawa Diagram

Fishbone Diagram, also known as the Causes-and-Effects representation, is a graphical technique which will clearly explain and highlight the causes of a certain situation. The alternative reasons are shown in connected branches at different stages showing the quantity of complexity rising when the branch spreads externally, i.e. an external branch is a cause of the internal branch to which it is attached. As a result, the most external one typically reveal the problem's main causes. Ishikawa Diagram is shaped like a fishbone (otherwise called "Fishbone Diagram", ` using a box "fish head" at one end of the diagram containing problem description. The diagram's primary branch (the ‘fish spine’) emerges from this box. Major branches branching off from this main branch shows a breakdown of the reasons according to their type. (http://www.siliconfareast.com/ishikawa.htm)

3.4.1 Issues Related to Manpower

Workers who are dedicated to producing structures, such as planning, erecting, and modeling them, are referred to as manpower in the construction industry.

The author identified seven (7) variables of manpower related issues based on the prior literature analysis, as denote in Table 3.1.

Table 3. 1: Issues Related to Manpower

| 1. Absenteeism of workers on site |
| 2. Slow mobilization of labour by site officials |
| 3. Site workers embarking on strike action |
| 4. Lack of modern skills by some construction workers |
| 5. Lack of quality training to workers on modern construction techniques |
| 6. Frequent rise in daily charges for workers |
7. Gender diversity in workforce

Table 3. 2: Issue Related to Machineries / Equipment

<table>
<thead>
<tr>
<th>Issue Related to Machineries / Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wrong allocation of the equipment</td>
</tr>
<tr>
<td>2. Using obsolete equipment type</td>
</tr>
<tr>
<td>3. Breakdown of equipment almost all the time</td>
</tr>
<tr>
<td>4. Lack of adequate storage facility for equipment</td>
</tr>
<tr>
<td>5. Poor performance of Equipment due to less maintenance and outdated techniques</td>
</tr>
<tr>
<td>6. Lack of proper maintenance procedure for Equipment</td>
</tr>
<tr>
<td>7. Limited availability of equipment spare parts</td>
</tr>
<tr>
<td>8. Lack of trained experts for repairs of equipment</td>
</tr>
</tbody>
</table>

3.4.2 Issues Related to Management

Project management is a relatively recent discipline. Poor dedication to quality, inadequate management assistance, poor attentiveness to quality issues, and poor quality planning are some of the variables affecting the practice of quality management identified by (Abdullahi1, S. et al 2019).

Table 3. 3: Issues Related to Management

<table>
<thead>
<tr>
<th>Issues Related to Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Poor communication of quality requirements among the project team</td>
</tr>
<tr>
<td>2. Changing of sub-contractors at anytime</td>
</tr>
<tr>
<td>3. Poor communication and coordination with other parties</td>
</tr>
<tr>
<td>4. Poor site management and supervision</td>
</tr>
<tr>
<td>5. Inadequate contractor experience</td>
</tr>
<tr>
<td>6. Inadequate risk management</td>
</tr>
<tr>
<td>7. Unrealistic expectations/Bad forecasting</td>
</tr>
<tr>
<td>8. Lack of commitment/support from top management</td>
</tr>
<tr>
<td>9. Poor management of equipment as per the type of work</td>
</tr>
</tbody>
</table>

3.4.3 Issues Related to Funding

The construction business is heavily influenced by financial management. One of the most important aspects affecting the success of the project, as in addition to its quality and safety, is paramount. Timely completion of road building projects (Aziz et al., 2016). Accordingly, the key determinants of construction process planning, which comprises the activities required to execute excellent work in order to achieve project objectives, are a cost-effective policy, competence, and profitability (Mahmood et al., 2010).

Table 3. 4: Issues Related to Funding

<table>
<thead>
<tr>
<th>Issues Related to Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rising cost of materials at all times</td>
</tr>
<tr>
<td>2. Taking long time for payments of contractors by clients</td>
</tr>
<tr>
<td>3. Poor available funds management</td>
</tr>
<tr>
<td>4. Insufficient financial resources from the contractor side</td>
</tr>
<tr>
<td>5. Poor financial control on site</td>
</tr>
<tr>
<td>6. Late payment of employees by contractors</td>
</tr>
<tr>
<td>7. Fraudulent practice and kickbacks</td>
</tr>
</tbody>
</table>
3.4.4 Issues Related to Duration

The quality of construction project is the most important key indicators, which may contribute to cost overruns and delays. Except predetermined criteria that will result to the formation of QC/QA in an organization. Quality control in the construction sector includes client contentment, analysis of cost-benefit, and appropriate time to attain required quality. The ISO has developed a quality assurance approach for improving quality and resolving quality-related concerns. The ISO 9001 was established to ensure quality, and it may be utilized by any type of organization.

Table 3.5: Issues Related to Duration

| 1. | Change in project scope during construction process |
| 2. | Project complexity and difficulties during execution |
| 3. | Lack of proper planning and scheduling of the project |
| 4. | Changes and variations in design |
| 5. | Lack of accuracy and mistakes in engineering estimate |
| 6. | Improper execution phase management |

4. Data Analyses

Five components were established through literature investigations, and a total of 37 questions were developed, with distinct questions for each factor. Around seventeen enterprises in and around Birninkebbi. One hundred and fifty three (153) questionnaires were distributed to 17 construction sites in and around Birninkebbi. The targeted respondents were site engineers, contractors, consultants and supervisors in various companies. As a result, 136 questionnaires were returned representing 88.88% of the total questionnaires distributed. From the questionnaire survey, the percentage variations between the factors are calculated and the top most influencing factors were identified. The RII method was used to find the relative importance of several factors affecting quality assurance and quality control on construction projects. RII values ranges from 0 to 1 (M.S Jowwad and S.K Gupta, 2019). The greater the impact or frequency of occurrence of the variables, the higher the RII value. The equation below is used to determine RII for each factor.

5. Findings and Results of Research

In table 4.1, the mean RIIIs and ranks of all categories were displayed 10 most influenced factors on quality of construction works are displayed in table 5.0. As stated in the rankings of the factor categories, the five factors of each categories that impart most in affecting the quality of construction works were discussed in the following manner.

5.1.1 Funding Related Issues (RII = 0.843)

Funding related categories of quality factors was the most essential group that affects the quality. This was mainly due to the factors Taking long time for payments of contractors by clients (RII = 0.918), Rising cost of materials at all times (RII = 0.898), Poor financial control on site (RII = 0.883), Insufficient financial resources from the contractor side (RII = 0.837), Poor available funds management (RII = 0.819)
5.1.2 Issues Related To Duration (RII = 0.825)
The second most essential categories was issues related to duration, whose crucial factors were .Lack of proper planning and scheduling of the project (RII = 0.913), Changes and variations in design (RII = 0.876), Change in project scope during construction process (RII = 0.875), Project complexity and difficulties during execution (RII = 0.851), Improper execution phase management (RII= 0.772).

5.1.3 Equipment/Machinery Related Issues (RII = 0.819)
Following the duration related issues, the third most important categories of quality factors was the equipment/machinery related issues. Some of the significant factors are Breakdown of equipment almost all the time (RII = 0.876), .Lack of trained experts for repairs of equipment (RII = 0.862), Wrong allocation of the equipment (RII= 0.839), Lack of adequate storage facility for equipment (RII = 0.826), Using obsolete equipment type (RII = 0.818).

5.1.4 Manpower Related Issues (RII = 0.802)
Subsequently, manpower related issues of quality factors was ranked the fourth paramount. The notable factors were absenteeism of workers on site (RII =0.887), lack of modern skills by some construction workers (RII = 0.863), Slow mobilization of labour by site officials (RII = 0.791), .Lack of quality training to workers on modern construction techniques (RII = 0.791), Site workers embarking on strike action (RII= 0.768).

5.1.5 Management Related Issues (RII = 0.802)
Management related issues of quality factors was the last and least preeminent categories. The prominent factors were poor communication of quality requirements among the project team (RII = 0.866), poor management of equipment as per the type of work (RII = 0.866), Inadequate risk management (RII = 0.857), Poor site management and supervision (RII= 0.820). Lack of commitment/support from top management (RII=0.815).

Table: 5.0 Ten Most Impacting Factors on quality

\[ RII = \sum W / (A \times N) \]

From the RII= Relative Importance Index, W= weighting given to by respondents (ranging from 1 to 5), A= highest weight (i.e 5 in this case) and N= total number of respondents. The RII, and ranking of all groups of a quality factor are shown in the table below.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Factor Group</th>
<th>10 Most Impacting Factors On Quality</th>
<th>RII</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Funding Related Issues</td>
<td>Taking long time for payments of contractors by clients</td>
<td>0.918</td>
<td>1ST</td>
</tr>
<tr>
<td>2</td>
<td>Issues Related To Duration</td>
<td>Lack of proper planning and scheduling of the project</td>
<td>0.913</td>
<td>2ND</td>
</tr>
<tr>
<td>3</td>
<td>Funding Related Issues</td>
<td>1.Rising cost of materials at all times</td>
<td>0.898</td>
<td>3RD</td>
</tr>
<tr>
<td>4</td>
<td>Manpower Related Issues</td>
<td>Absenteeism of workers on site</td>
<td>0.887</td>
<td>4TH</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Poor financial control on site</td>
<td>0.883</td>
<td>5TH</td>
</tr>
</tbody>
</table>
### Conclusion

This research work presents the results of the analyses of factors that has impact on quality assurance and quality control on construction projects. A thorough literature review, observation methods, and interviews of construction site professionals and skilled artisans was conducted to determine the factors that are most afflicitive to quality assurance and quality control of construction projects. Thirty (37) different quality factors were developed and categorized into five (5) groups as follows: Manpower Related factors, Equipment/Machinery Related Issues, Management Related Issues, Funding Related Issues, issues Related to Duration. These groups of quality factors were successfully exhibited through the utilization of the Ishikawa (fishbone) diagram because is suitable for displaying factors, showing relationship between different groups of variables, and end results associated to the factors. In addition, the data obtained from the respondents was calculated by using the RII method and the relative importance of quality factors was consequently obtained, illustrating the groups ranking in accordance with the importance levels of a particular group to quality of construction projects. The research however addresses the most essential factors and groups affecting the quality on construction projects. At the end, the ten important factors were achieved through ranking results.

### Recommendations

Considering the research findings, the following recommendations were made for the continuous quality improvement of construction projects.

1. Timely payment of contractors by the clients for the level of work executed according to the contract terms and agreement without undue delay this will however improve the quality of projects on construction sites.

### Source: Survey 2022
2. Proper planning and scheduling should be encouraged right from the inception stage of any construction project; this will help to enhance the achievement of a quality product during construction, as such professionals should be engaged to handle this task.

3. The scope of a project should always be maintained; careful attention should be paid in the sense that project scope should not be changed during project execution, as this would adversely affect the quality of a construction project.

4. Embarking on regular check and maintenance of plant and equipment is to be encouraged as this will help to prevent frequent and unexpected breakdown of the equipment during the execution of construction projects. Regular cleaning and provision of adequate storage facility for equipment is also advisable.

5. A very good attendance policy should be clearly prepared and duly adhered so as to curtail the issue of absenteeism to work by construction workers. Incentive to workers should be made available at regular period to encourage the attendance of workers. Upskilling programs on modern construction skill should also be organized to enhance staff development and good handling of modern construction works.

6. Good communication of quality requirements among the project team must be of priority; this would help the construction team to know what is required of them in terms of quality for a particular unit of work and at a particular stage of job.

7. The issue of fraudulent practice and kickbacks by contractors to government officials have to be properly checked and discouraged, drastic measures are to be taken on whoever is found wanting in this regard, the quality of projects on construction suffers a lot of drawback whenever fraudulent practice takes place.

REFERENCE


