



QUALITY CONTROL MECHANISMS IN BUILDING PRODUCTION MANAGEMENT IN NIGERIA

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ABSTRACT

This work focuses on the depreciating quality of buildings produced with particular attention to their production process. It highlights the need to ensure adequate knowledge of qualitycontrol mechanisms in the production of buildings in order to meet the expectation of the public. The work also highlights the concept of quality assurance and control as they apply to the construction of buildings. The investigation carried out shows that the professionals in the Nigerian Construction Industry are still limited in awareness of quality control mechanisms in building production management this translates to their low involvement in quality control measures in the production process. Some of the professionals rarely carry out on the spot inspection of ongoing projects to guide those contractors who lack knowledge of necessary tests and standards required. Some major factors affecting quality controlin the building production process are better craftsmanship, testing and or measurement of work and products, education and training and improved management – employee relationship.

Key Words: *Building production process, Quality Assurance, Quality Control*

INTRODUCTION

Quality control in building production process deals with the complete implementation of quality policies by assuring control measures are strictly adhered to throughout the production process. Quality sustenance in the Nigerian construction industry is a major problem with regard to design and construction management. A high construction defects rate has greatly affected the reliance of the public on housing purchase. This makes it necessary to develop a quality control mechanism for reducing building defects. [1] opines that quality control entails testing of products to uncover defects and reporting to management to allow or deny product use.



The research aims at evaluating the knowledge of quality control mechanisms available in building production management for sustainable productivity in the Nigerian Construction industry.

The primary objectives of the study are:

1. To identify the mechanisms of quality control
2. To assess the efficacy of the current quality control processes in the Nigerian construction industry
3. To make recommendation for effective quality control mechanisms where not available for sustainable building production management.

[2] opines that the building production process consists of five distinct but not mutually exclusive activities namely: Construction planning, Buildability (i.e. the optimum use of construction knowledge) and Maintainability analysis, Quality control, Assembly and Incidentals. During construction planning, it is safe to assume that the production information documents must be properly approved for execution for effective planning to take place. Construction planning is thus concerned with economic building rather than cheap building. Clients therefore require the efficient utilization of resources and governments express their minimum demands in the form of building regulations, codes and laws.

The basic function of Buildability and maintainability analysis is to determine and minimize or remove waste and wasted efforts prior to commencement of work on site. This analysis is not meant for the builder to find faults in the designer's work but to study the production information and suggest ways in which the design could be improved upon. The most important job of the builder is to complement the efforts of the designer and add more value to the client's investment.

Quality Control issues are vital for the builder to build right the first time.[2] clearly states that understanding the design and requirements of a project are important for successful quality control of a project. Where there are changes to the original design/specification, they should not compromise the quality of the work.

The Nigerian government in a bid to assure quality control in the construction industry has over the years promulgated and enacted various decrees and acts to assist in regulating various professionals in the construction industry. Some of the decrees and acts in existence in the Nigerian construction industry are:

1. Cap 55 of 1970 amended by decree 27 of 1992 establishing the Council for the Regulation of Engineers (COREN).
2. Act Cap B 13 LFN 2004 (formerly Decree 45 of 1989) established the Council of Registered Builders of Nigeria (CORBON).
3. Decree 3 of 1988 established Town Planning Registration Council of Nigeria (TOPREC).

4. Decree 22 of 1986 established the Quantity Surveyors Registration Council of Nigeria (QSRCN).
5. Decree 44 of 1978 established the Surveyor's Registration Council of Nigeria (SURCON).
6. Cap 111 of the Federal Republic of Nigeria (formerly decree 24 of 1975) established the Estate Surveyor's and Valuer's regulation Board of Nigeria (ESVRBN).

The essence of these legislations is to ensure adequate quality control in construction projects for the various professionals. Desired project standards can therefore be achieved through the provision regulations and policies. The construction standards throughout the country have however remained at a low standard when compared with standards of the international community [3].

[4]state that there are three reasons why management decisions affect the quality of construction namely:

1. Lack of Management Commitment: Some of the reasons which account for lack of management commitment is lack of awareness of the benefits of management quality control and haphazard implementation due to market pressure.
2. Inconclusive Interpretation of Required Standard:[4] opine that some ambiguity may arise with reference to the use of the ISO standards as these have their origins in the engineering sector.
3. Inadequate training policies: Most indigenous construction companies do not seem to have a training policy on ground as most of the workers are employed on ad-hoc bases.

METHODOLOGY:

The methodology applied in the research was the literature review, semi-structured interviews and questionnaire survey. The target population for the research was professionals in the industry (Architects, Builders, Quantity Surveyors, Town planners, Land Surveyors and Estate Valuers.) For the data analysis, Simple percentage method and ranking methods were employed.

RESULTS AND DISCUSSION:

Table 1: Professionals with quality control policies in their organisations.

Quality Control Policy	No of Responses	% of Responses
Yes	34	72
No	13	28
Total	47	100

A total of 47 respondents were achieved for the research and in order to guide the respondents on the focus of the study a question was asked on the meaning of quality. Table 1 shows the responses.

The result from table 1 shows that 72% of respondents have quality control policies in their companies while 28% have no quality control policies.

Table 2: Quality control systems used to drive policy in the industry

S/No	Standards	No. of Respondents	% of Respondents
1	ISO 9001 – 2000 (Quality Management Principles)	10	29
2	BS 5750 (Quality Assurance Systems)	7	20
3	EN 29002	5	15
4	ISO 14000	4	12
5	ISO 14001 – 2004	3	9
6	National Building Code 2006	5	15

Table 2 indicates that the National building code and EN 29002 are most widely used to ensure quality control with 15% of respondents each using it.

Table 3: Measure/Indicator of quality in the Nigerian construction industry

S/No	Measure /Indicator	No of Respondents	% of Respondents
1	Customer Satisfaction	4	8
2	Management commitment	9	19
3	Repeat business	4	8
4	Regular inspection	5	11
5	Skilled Labour	4	8
6	Training	6	13
7	Period of warranty	3	6
8	Keeping to construction standards	4	8
9	Certified quality programs in place	5	11
10	Appearance of completed project	3	6

Table 3 shows 19% of respondents believe management commitment to quality is the best indicator of quality control while the period of warranty indicated on the product is the least indicator of quality.

Table 4: Control mechanisms used in Building Production Management

Mechanisms	Very High	High	Ave.	Low	Very Low	Rank Sum	Rel. Index	%	Rank Order
Organisational culture	7	9	9	14	8	148	0.63	63.00	9th
Management commitment	5	8	9	11	14	162	0.68	68.00	8th
Skilled work force	2	5	11	17	12	173	0.74	74.00	3rd
Effective communication between management and employees	2	5	9	18	13	176	0.75	75.00	2nd

<i>Training and Education</i>	5	8	3	13	18	172	0.73	73.00	4 th
<i>Well defined job roles and responsibilities</i>	5	6	7	17	12	166	0.71	71.00	5 th
<i>Clear project goals and objectives</i>	2	5	8	14	18	182	0.78	78.00	1 st
<i>Regular performance reviews</i>	5	7	5	21	9	163	0.69	0.69	7 th
<i>Existing quality control policy</i>	6	5	12	7	17	165	0.70	70.00	6 th

From table 4, clearly defined company goals and objectives ranked first in the quality control mechanisms used in building production management with a relative index of 0.78. Next was effective communication between employers and employees with a relative index of 0.75. The least quality control mechanism was organizational culture with an index of 0.63.

Table 5: Professional's Ranking of the Important Elements of Quality Control

<i>Elements</i>	<i>Very High</i>	<i>High</i>	<i>Ave.</i>	<i>Low</i>	<i>Very Low</i>	<i>Rank Sum</i>	<i>Rel. Index</i>	<i>%</i>	<i>Rank Order</i>
<i>Training and education of employee and management staff</i>	2	6	10	12	17	177	0.75	75.00	2 nd
<i>Clearly defined guidelines for client satisfaction</i>	5	8	6	16	12	163	0.69	69.00	5 th
<i>Means and methods for ensuring continuous improvements</i>	5	8	4	18	12	165	0.70	70.00	4 th
<i>Clearly defined goals relating to quality work performance</i>	5	3	6	13	20	181	0.77	77.00	1 st
<i>Systems for collecting and tracking data for ensuring quality objectives</i>	5	9	7	16	10	158	0.67	67.00	6 th
<i>Review process to identify errors in the system</i>	7	2	10	12	16	169	0.72	72.00	3 rd

Table 5 shows that the most important element/characteristic of quality control is having clearly defined goals relating to work performance with a relative index of 0.77. Next is training and education of staff with a relative index of 0.75 and the least important element was the system for collecting and tracking data for ensuring quality. This had an index of 0.67.

Table 6: Suitable Steps for Implementing Quality Control Systems in the Nigerian Construction Industry

Steps	Very High	High	Ave.	Low	Very Low	Rank Sum	Rel. Index	%	Rank Order
Securing Client's commitment to quality	3	5	8	14	17	178	0.77	77.00	1 st
Educate and change the attitude of staff	2	5	10	17	13	175	0.75	75.00	3 rd
Prepare quality plans for all levels of work	3	6	7	15	16	176	0.76	76.00	2 nd
Promoting staff participation and contributions through quality control motivation programmes	3	5	8	14	17	178	0.77	77.00	1 st
Regular review of quality plans and performance measurements	6	2	8	17	14	172	0.73	73.00	4 th

On the steps for implementing quality control, table 6 shows commitment of the client to quality and staff participation in motivation programs were most important with a relative index of 0.77 each. Next ranked preparation of quality plans for all levels of work with an index of 0.76 and least was review of plans and performance measurement with an index of 0.73.

Table 7: Processes to Minimize Actual or Potential Non-Conformance to Quality Standards

Processes	Very High	High	Ave.	Low	Very Low	Rank Sum	Rel. Index	%	Rank Order
Identify potential non-conformance risks to quality control	2	7	6	8	10	116	0.70	70.00	4 th
Initiate Regular quality report	3	1	7	13	9	123	0.75	75.00	3 rd
Notification of non-conformance	4	3	5	6	12	109	0.66	66.00	5 th
Taking necessary actions against non-conformance issues	1	3	5	13	11	129	0.78	78.00	2 nd
Proper analysis of non-conformance reports	5	4	10	9	5	104	0.63	63.00	6 th
Regular quality tracking on projects	3	2	5	7	16	130	0.79	79.00	1 st

On processes to minimize actual or potential non-conformance to quality standards, table 7 shows that tracking report of work is most important with an index of 0.79. Next is attempting to resolve any non-conformance issues with an index of 0.78. The least important process was the distribution of non-conformance reports with an index of 0.63.

Table 8: Barriers to Quality Control in the Building Production Process

<i>Barriers</i>	<i>Very High</i>	<i>High</i>	<i>Ave.</i>	<i>Low</i>	<i>Very Low</i>	<i>Rank Sum</i>	<i>Rel. Index</i>	<i>%</i>	<i>Rank Order</i>
<i>Lack of skilled labour</i>	7	6	10	9	15	160	0.68	68.00	1 st
<i>Award of contract to lowest bidder</i>	7	7	19	4	10	144	0.61	61.00	3 rd
<i>Lack of effective building teams skills</i>	7	8	9	16	7	149	0.63	63.00	2 nd
<i>Use of adversarial forms of contract</i>	6	14	10	11	6	138	0.59	59.00	4 th
<i>Hostile union environments</i>	12	7	14	8	6	130	0.55	55.00	6 th
<i>Too many restrictive building codes</i>	8	15	10	5	9	133	0.57	57.00	5 th
<i>Contractor reliance on litigation process for dispute resolution</i>	8	18	8	7	6	126	0.54	54.00	7 th

Table 8 shows the greatest barrier to quality control in the building production management process is Lack of skilled workers with a relative index of 0.68. The next barrier is the lack of effective teams with an index of 0.63 while the least barrier was reliance on litigation process for dispute resolution with an index of 0.54.

Table 9: Drivers of Quality Control in the Building Production Process

<i>Drivers</i>	<i>Very High</i>	<i>High</i>	<i>Ave.</i>	<i>Low</i>	<i>Very Low</i>	<i>Rank Sum</i>	<i>Rel. Index</i>	<i>%</i>	<i>Rank Order</i>
<i>Education and Training</i>	6	3	7	14	17	174	0.74	74.00	3 rd
<i>Testing and measurement of work done</i>	2	6	7	13	19	182	0.77	77.00	2 nd
<i>Improved craftsmanship</i>	2	4	9	14	18	183	0.78	78.00	1 st
<i>Improved employee-management relationship</i>	5	4	9	11	18	174	0.74	74.00	3 rd
<i>Stronger prequalification criteria</i>	4	11	10	8	14	158	0.67	67.00	5 th
<i>Increase in adoption of design and build contract</i>	2	12	13	5	15	160	0.68	68.00	4 th

Table 9 shows that improved craftsmanship and on the spot testing of products and materials are the greatest drivers of quality in the building production management process with indexes of 0.78 and 0.77 respectively. The least driver was improving pre-qualification criteria for contractors.



CONCLUSION

The complexity of the building process demands a high level of awareness and commitment to quality control standards. Poor quality implies wasted resources and low standards in finished products. Quality in the building production process ensures client satisfaction, consistency in conforming to specifications and achieving the overall project goals. Quality control and assurance are however the sole responsibility of the contractor and the research shows that those responsible for quality in the building production process in the Nigerian Construction Industry have failed in their duties.

The assessment of quality control practices is very low as majority of the contractors do not carry out material tests to ascertain their quality before incorporating them into the projects. Some consultants also fail in their responsibility to carry out on the spot checks to guide contractors who lack knowledge of the specific tests and standards required. There should therefore be a qualified registered professional resident on site to manage the quality control mechanisms for building projects. This research recommends that in order to meet the desired quality control goals in the building production process, there is a need for the training of construction industry employees on proper and adequate quality control measures to be used during the building production process.

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