Perception of Professionals in the Nigerian Building Industry on Specifications for Sanitary Appliances - A *Case* Study of Kaduna State

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Abstract

The study determined the quality of specification provision in sanitary appliance works, to determine compliance for quality assurance. Convenience sampling was employed where 100 questionnaires were administered to seek the perception of various professionals on specification practices in Kaduna State. Findings confirmed Architects as the main source of specification information (with 33.33% of responses); freedom from rework and dispute are more common benefits of compliance to specifications (with 48.61% of responses). Thus, most professionals are aware of the specification benefits/importance given in any construction project. It was concluded that the majority of respondents show that Code of Practice and reference to previous speci fications are the factors that improve adequacy of specification. It is therefore recommended that the application of specification provisions in the Nigerian Building industry should be enforced by relevant authorities using the Code of Practice or other relevant standards.

Keywords: Building design, construction professionals, quality assurance, sanitary appliances, specification

Introduction

Construction work is becoming more complex leading to the use of new materials, techniques and approaches. As such, there is need for adequate and appropriate specification writing and compliance for quality assurance. Specifications form the basis of all contract offers and when the contract is in place, it becomes an essential contract management document used to ensure that the chosen contractor provides what is specified. Building construction is the process of assembling/coupling materials and products to produce buildings. It is far from being a single activity but rather a feat of human multitasks generally performed by professionals and craftsmen through design and production documents. The design usually consists of drawings and specifications, usually prepared by design team including Surveyors, Civil Engineers, Cost Engineers (or Quantity Surveyors), Mechanical Engineers and Architects (Chitkara, 1998). The ultimate objectives of the design is to provide all necessary information for the building production process and is achieved by the production of working drawings showing what is to be constructed, while specifications state what and how materials and equipment are to be used (Ballard, Tommelein and Aves, 2005).

According to the Victorian Government Purchasing Board (VGPD, 2009), specification is defined as a document primarily used in procurement to clearly and accurately describe the essential requirement for goods, product and services, and sometimes specifies the workmanship. It also spells out and recommends standards of materials, procedures, workmanship, tests, good practices to complete the works in required quality and time. It is therefore used in the Building Industry for three primary purposes of conveying information concerning desired products, providing a basis for competitive bidding and to measure compliance to contracts (Institute for Construction Training and Development {ICTAD}, 2008). Moreover, specification covers description of the type, brand, color and its labor installation, binding materials, and accessories (New Zealand Qualifications Authority {NZQA}, 2012}).

Ibbs and Allens (1995) asserted that sanitary appliances in accordance with BS6465 are broadly divided into two groups: those for washing purposes, waste appliances; and soil appliances, for the removal of human excreta. Sanitary appliances and fixtures are selected in accordance with owner and or users' requirements and job specifications. It is also installed and connected to water supply and disposal services termination points in accordance with job specifications and relevant standards and codes (NZQA, 2012). As specification defines the equipment, tools and plants to be used in a project, it also serves as a guide to the Project Manager and supervising staff of the project and the owner to execute the work to his satisfaction (Bokinni, 2007; ICTAD, 2008).

Ibbs and Allen (1995) posited that most cases of accidents in buildings are caused by faulty design and poor/inappropraite specifications, inadequate knowledge of personnel and none adherence to specification provisions. Thus, lack of compliance to specification on sanitary work in the design and construction of buildings may lead to waste of materials, time, resources, and poor execution. This invariably makes it difficult to achieve

quality assurance of sanitary work in building (Shingo, 1988). Inadequate knowledge of personnel in small and large scale construction firms on specification is yet another problem that may result to a lot of rework which leads to organizations incurring unnecessary cost.

The importance of specification and its basic requirement through professionals' perception on the provisions of specifications is therefore highlighted, which requires the competence and/or ability of the Construction Managers or Builders to translate performance-specifications to method-based specification for sustainable production process (Nunnally, 2007). Moreover, the perception of professionals on specification provision for sanitary works in the Nigerian building industry was sought in the research, to determine compliance towards quality assurance, in Kaduna State.

Literature Review

According to Bokini (2007), specifications can either be Performance-based whereby the specifiers restrict the performance that must be achieved in section of work, or prescriptive (method based) whereby the specifiers indicate specific products, vendors and even contractors that are acceptable for each work scope. Nunnally (2007) however postulated that specification writers should avoid specifying both method and performance requirements for the same operation. When the provisions of the plans and specifications conflict, requirements of specifications take precedence.

The various approaches/methods to specifications writing as described by Electronic National Productivity and Quality Specifications (eNPQS: 2012) are: Method specification which states the precise equipment and procedure to be used in performing a construction operation. Performance/result/end-result specification which specifies only the result to be achieved and leaves the choice of equipment and methods to the contractor or Builder and most often the product payment is directly dependent upon its actual performance. Proprietary product specification which is used when a generic description of a desired product or process cannot be easily formulated and a reference specification clause remain as a published document with which processes and product must comply. Closed, open, restricted, exclusive and negative specifications used for the purpose of drafting.

Selecting and specifying the most appropriate materials and systems for a project to meet the client's requirements and expectations of quality, time, value, environmental impact, and maintenance and durability are fundamental part of building design. Drawings are graphic descriptions which primarily define quantity, position and sometimes quality while specifications are written descriptions which define quality and together they express the designer's intentions (NATSPEC, 2010).

In building design and construction, the Architect, Quantity Surveyor and the Services Engineers are the specialists specifiers. The Architect gives the specifications of the drawings and schedule to the Quantity Surveyor to prepare Bill of Quantities and Services Engineers give Mechanical and Electrical specifications. Ballard (2000) posited that specifications are contractual requirements written as communication between two parties in one direction, from one party (the owner) to another (the contractor).

They include the procedures for determining that, the requirements are met and have the purpose of linking the drawings with the general conditions of contract (VGPB, 2009; NATSPEC, 2010).

It is imperative to find and study the list of codes for sanitary appliances and water fittings when writing specifications of sanitary appliances or undertaking building works. The importance of the document is to complement drawings so that it conveys all the design and construction decisions. It also links the drawings with the general conditions of contract, and complements the information not provided in the drawings without duplication (Bokinni, 2006).

The benefit of specifications of building works includes being an essential contract document used in arbitration or court cases. Thus, a good specification is characterised by clarity, specificity, accuracy, completeness and ease of understanding (Bokinni, 2007; NATSPEC, 2010).

It sets the quality requirements for materials and workmanship and became necessary for the purpose of achieving such requirements that, the Nigerian Building Industry and the stakeholders establish a set of standard specifications for building projects (eNPQS, 2012). The aim would then be to harmonise the industry building specifications and provide a standard platform for achieving greater efficiency and quality in the design and construction processes.

It is evident in many countries, as cited in eNPQS (2012), that the complete set of project specifications comprises two documents: the National Productivity and Quality Specifications (NPQS) and the Project Specific Data (PSD) sheets. The former is a reference document setting out common specifications and requirements for most common types of building works, while the later are simple templates created to allow the Architecs and Engineers to input their projects' specific requirements that cannot be standardised in the NPQS. Thus, this hold in many nations including UK, US, New Zealand and South Africa (eNPQS, 2012; NZQA, 2012).

Madan, Walter and Diane (2010) postulated that specifications and drawings are to complement each other. Specifications are written technical descriptions of the design intent, whereas the drawings provide the graphic description. With so many parties in the production process using the two documents, it is necessary to organize the two in a standard format and is sometimes referred to as master format for quality assurance.

Quality in design is presented in drawings and specifications of materials, products and workmanship for quality assurance in all forms of building works. According to Leonard and Robert (2011), quality assurance can be referred to as a systematic measurement, comparison with a standard, monitoring of processes and an associated feedback loop that confers error prevention. It is therefore imperative to assess how suitable the specifications of sanitary appliances are, and its fitness for the purpose according to professionals' perceptions.

Drawings and specifications are architectural instruments that establish minimum quality assurance requirements and are the legal documents responsible for ensuring end-products are produced to standard, notwithstanding who the contractors are or what type of specification method was used for the purpose (Sintered Specialties: SSI, 2007). Love and Li (2000) asserted that the provision of appropriate specifications of

sanitary appliances provides quality assurance which is dependent upon a good source of information and the perception of professionals on the availability and quality of the materials used.

Methodology

Convenience sampling was adopted for this study due to unavailability of exact data to form the study population of the respondents in the study area. Questionnaire survey using open ended questions was the main instrument used in this study. The study was conducted in Kaduna State of Nigeria because it has a high proportion of construction professionals and construction works and/or activities. Construction professionals comprising Architects, Builders, Quantity Surveyors, and Engineers were selected because they were the bulk of professionals readily available when the study was conducted. One hundred (100) questionnaires were administered (25 questionnaires to each of the four sets of professionals for the sake of equal representation). Seventy two percent (72%) were properly filled and returned for the analysis.

The questionnaire sourced information on the perceptions of the professionals on the quality of sanitary appliances specification, source of information for writing the specification, benefit of compliance to specifications and factors that improve the quality of the specifications. The data were collected using two sets of four-point Likert scale and analysed using descriptive statistics.

Discussion of Results

The responses from the professionals on various issues affecting quality of specifications and the benefits of compliance are hereby presented in tables and bar charts:

Perception of professionals on the quality of specifications for sanitary appliances

Table 1 depicts the response of professionals on their source of information on specifications

Table 1: Respondents Source of information on Specification

Specification sources	Number of response	% of Response
Architects	24	33.33
Quantity Surveyor	14	19.44
Previous specification	4	5.56
Code of practice	15	20.83
Building Regulation	15	20.83
Total	72	100

Source:Questionnaire (2011)

The results indicate that respondents get their information on specifications mostly from Architects with a response rate of 33.33 percent compared to other sources. This may be because they are responsible for architectural drawings. Second to them are respondents sourcing information on specifications from the Code of practice and Building regulation with a response rate of 20.83 percent each. The next sources of information on specifications sourced by the respondents are from Quantity Surveyors with a response rate of 19.44 percent. The least source of information by the respondents on specifications is from previous specifications with a rate of 5.56 percent. (Figure 1 shows benefits of compliance to specifications by respondents).

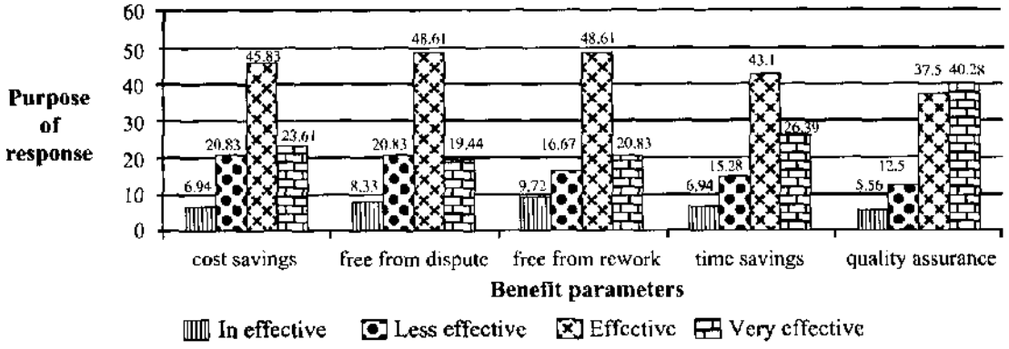


Figure 1: *Benefits of compliance to specification*
Source: Questionnaire (2011)

In all the parameters studied, effective and very effective benefits to compliance had a total of over 65 percent. It then shows that cost savings, free from disputes and rework are more effectively adhered to than the others. While quality assurance and time savings are perceived less effective. (Figure 2 shows the factors that improve the adequacy of specifications).

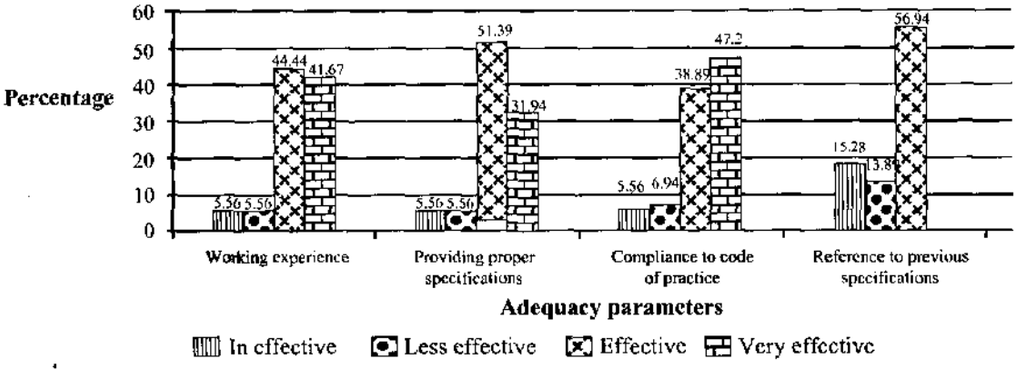


Figure 2: *Factors that improves the adequacy of specifications*
Source:Questionnaire (2011)

About 55 percent of the respondents are of the opinion that reference to previous specifications and providing proper specifications are more effective in improving the adequacy of specifications, while over 80 percent of the respondents opine to working experience; compliance to code of practice range from being in-effective or less effective in improving the adequacy of specifications.

Table 2 portrays the extent of effectiveness on the quality of specifications given by the architect and cost estimators.

Table 2: Quality of specifications given by the Architect and cost estimators

	Architect Specification		Cost Estimators	
Extent	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Very effective	7	9.72	22	30.56
Effective	8	11.11	40	54.17
In effective	45	62.5	5	7.94
Very in effective	12	16.67	5	6.94
Total	72	100	72	100

Over 57 percent of the respondents opined that the quality of specification given by the Architects is at least effective. Also, 84.73 percent opined that the quality of specification given by the cost estimators (Quantity Surveyors) is at least effective. (Table 3 shows the extent of quality and performance level of sanitary appliances after commissioning).

Table 3: Quality and performance level of sanitary appliances after commissioning

Quality/ Performance	Frequency	Percentage
Very poor	8	11.11
Poor	9	12.50
Good	35	48.61
Very good	20	27.78
Total	72	100

Source: Questionnaire (2011)

More than 76 percent of the respondents attested that the quality and performance level of sanitary appliances after commissioning of buildings are at least good.

Figure 3 portrays the problems of application of specifications in Nigerian Building Industry.

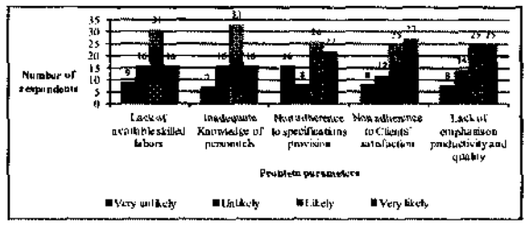


***Figure 3:** Problems of application of specifications in Nigerian Building Industry Source: Questionnaire (2011)*

More than 65 percent of the respondents attested to the fact that the parameters studied are 'likely' and 'very likely' a source of problem of the application of specifications in Nigerian Building Industry.

Table 4 portrays the extent of applying specifications principles in the Nigerian Building Industry.

Table 4: Level of applying specifications in the Nigerian Building Industry

Levels of Application	Frequency	Percentage
Always	13	18.10
Often	25	34.72
Seldom	27	37.50
Never	7	8.33
Total	72	100

Source:Questionnaire (2011)

Fifty two percent of the respondents in this study apply specifications on an 'often' to

'always' basis. About 37 percent apply specifications seldomly while a little over 8 percent never apply specifications.

Findings

The following findings were made from this research:

a. Professionals in the Nigerian Building Industry get their source of information on specifications least from previous specifications. This shows that majority of the respondents rely mostly on specifications from either professionals that produce Building Production documents or from approved codes;
b. Professionals derive more benefits from their compliance to the use of specifications than otherwise;
c. Quantity Surveyors give more qualitative specifications than Architects because professionals rely more on the cost of products rather than its descriptions;

Conclusion

Specification is of immense benefit to the Building industry in the execution of all forms of building works. The overall perception of the respondents from this study has shown that most professionals are aware of the specification benefits/importance, and majority show that Code of Practice and reference to previous specification are the factors that improve the adequacy of specification. Inadequate knowledge of personnel together with non adherence to specification provisions are the common problems of specification application in the Nigerian Building Industry.

Therefore, Professional bodies in the Building industry should comply with the specifications given in any building and construction project in order to reduce the level of rework and for the avoidance of disputes. Also, the application of specifications provisions in the Nigerian Building industry should be enforced by the relevant authorities using appropriate Codes of Practice.

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