



APPRAISING CONTRACTORS' PERCEPTION OF PRICING PRELIMINARIES OF HOUSING PROJECTS IN KADUNA, NIGERIA



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Abstract: The paper appraised contractors' perception of pricing preliminaries of housing projects in Kaduna, Nigeria and achieved the following objectives: identified and evaluated common preliminary items in bill of quantities priced by building contractors; identified and evaluated the level of significance of factors that contractors consider in pricing project preliminaries; assessed the methods contractors adopt in pricing project preliminaries; and estimated the cost ratio of preliminaries to final contract sum of projects carried out by contractors. Data were obtained through exploratory survey of 50 firms involved in mass housing projects and mean rating (MR) was used to evaluate factors that influenced pricing of preliminaries by contractors. Results obtained shows that water, lighting and power with significant mean rating of 4.72 is the commonly most priced item of preliminaries. Nature of construction site is ranked topmost factor which influence pricing of preliminaries by contractors with 4.68 MR. Responses on the perception of contractors regarding methods of pricing project's preliminaries revealed that 48% of the contractors used percentage ratio. 30 and 22% of the contractors employed fixed charge (lump sum) and estimation methods, respectively. 10% of the contractors allowed more than 10% of the contract sum as amount of preliminary cost of a project. It is recommended that contractors should view project preliminaries pricing as a risk in contract sum estimation and approach it on the basis of their experiences in the field as well as on well thought-out discretion to avoid losses.

Keywords: Bill of quantities, building projects, construction industry, project preliminaries

Introduction

The Chartered Institute of Building (CIOB, 2009) Code of Estimating Practices defined preliminaries as "the costs of running a site as a whole (rather than any particular zone of the site or any particular activities). They are sometimes referred to as site overheads (or in the USA as 'field costs')". The preliminary section of bill of quantities give contractors the opportunities to price items of an organization and general nature which affect the cost of works but are not restricted to any particular works section (Fryer and Egbu, 2004). The first provision in bill of quantities normally contain a list of contract clause headings and detailed requirements of contractor's obligations and general facilities to be provided for construction works on site (Marsden, 1996). These provisions are listed in Standard Method of Measurement 7 (SMM7) of 1990 as Class A: Preliminaries/General Conditions of building works. These items of works form part of the project normally priced by the contractors separately from the elemental bills for the duration of the contract.

According to Martin (2004) the preliminary section of bill of quantities cover project overheads, such as site cost of administering a project and providing general plants, site staff, facilities and site-based services, and other items not included in all-in rates. The traditional purpose of bill of quantities is to act as a uniform basis for inviting competitive tenders and to assist in valuing completed works. Bill of quantities are first designed to meet the needs of estimators, although some estimators say the bill format has changed to assists the consultants, in cost planning exercises through the widespread use of elemental bills (Wallace and Ducan, 2005). According to Willis (2005) a contractor can also make use of the bill of quantities in many ways, such as planning for materials purchase, prepare resource programmes, and cost control during the contract to ensure work is within budget. Martin (2004) classified bill of quantities for building works into the following sections: Preliminaries, measured work and Prime cost, and provisional sums. Buchan, Grant and Fleming (2003) categorized the preliminaries (general items) section of a project and contract conditions as: description of the work,

location of the site, boundaries, names of parties, list of drawings, form of contract used with any amendments clearly defined, contract appendix details giving information such as retention percentage, liquidated damages, possession and completion dates and fluctuation provisions.

Specific item requirements are priced by contractors as fixed or time-related items to reflect the actual cost. These are supervision, site accommodation, temporary works, site running costs, general plant, transport, client's requirement and safety. The SMM7 provide for fixed and time-related items so that a contractor can show the cost of bringing plant or facilities to site, their maintenance during the progress of the project and removal on completion of the project. The SMM7 Measurement Code suggests that prices should be split between fixed and time-related sums only if the tenderer wishes to do so and there should also be allowance in the preliminaries section of a bill for the contractor to add to the list of items to suit his particular methods of working. By practice and site experience, Willis (2005) submitted that when pricing preliminaries, much thought and methodology should be applied to determine the extent of this allowance when tendering preliminaries and general items by virtue of its scope and broad definition, as it can easily contribute to huge losses if not correctly understood or determined at the tender stage. Charles (2007) put it that a prototype building within the same location and under same contract condition but priced by different contractor will in most cases have different prices. Yet, they have to follow all restrictions and requirements by the client and price what the client wanted for that particular project. Failure in fulfilling and pricing such items will raise problems later especially during construction. The contractor has to bear their own cost and definitely will incur loses. This is because items listed within the preliminaries are deemed to have been priced by the contractor.

In Kaduna North Central Nigeria, a common feature associated with pricing of preliminary items by contractors is the different preliminaries prices submitted by the various bidders for same or similar project. Wilmot-Smith (2006)

asserted that in most cases, contractors price items even more than twice in trying to safeguard his interest by ensuring that all items are not left un-priced leading to over loading or overpricing of the preliminary section, while some other contractors deliberately neglect some items in an attempt to come out as the lowest bidders resulting in under-pricing of preliminaries. If a contractor overlooked such item, it could cost him a great deal of money and they have to bear all the cost. Under limited time frame, some contractors refer back to a previously priced set of preliminaries of similar project and then extract the price for use in the current project for tender (Allen and Edward, 1998). Olamide (2013) stated that an under-assessment of preliminaries as far as cost is concerned is one of the reasons many builders and contractors do not receive a proper return of profit. That is to say, by under-pricing their preliminary, the loss recorded is deducted from profit. This is because all preliminary items listed in the tender are deemed to be priced by the contractor in accordance with the principle of standard method of measurement of building works (Morledge and Kings, 2006).

Clients encounter challenges during tender evaluation especially on cost comparison for preliminaries of each tenderer. If there are 30 tenderers for a particular project, according to Normah (2004), there is the possibility of having 30 different sets of price for the preliminary section of the bill of quantities. In some cases, tenderers do not price items of preliminary as provided, but just allow certain percentage out of construction cost for the preliminaries (Normah, 2004). Recognizing and understanding items needed to be priced for a given project, factors that influence the selection and pricing of this various items and also relating the total cost of preliminaries to contract sum of any project enable contractors to effectively assess and evaluate the preliminary of bill of quantities of building projects and ultimately achieve effective price for the project preliminaries. Therefore, this paper is aimed at appraising contractors' perception of pricing of project preliminaries of housing projects in Kaduna, Nigeria. The specific objectives are (1) to identify the common preliminary items in bill of quantities priced by building contractors in order to evaluate the level of significance of the items; (2) to identify and evaluate level of importance of factors that contractors consider in pricing project preliminaries; (3) to assess the methods contractors adopt in pricing project preliminaries; and (4) to estimate the ratio cost of preliminaries to final contract sum of projects executed by contractors.

Importance of bills of quantities and preliminaries in building industry

Bill of quantities (BOQ) has been one of the key control documents, in both the building and civil engineering sectors for over a century. The use of bill of quantities increases the efficiency in obtaining competitive tenders, as well as being the key document when calculating monthly payments and valuing variations (Seeley, 2001). It is a document that lists and itemized an estimate of how much material is needed, as well as manpower, equipment, profit and any other work that needs to be executed in order to complete the project. It is usually given out as a quote estimate in the bidding process (Potts, 1995).

According to Fenn and Gameson (2003) the traditional purpose of bills of quantities is to act as a uniform basis for inviting competitive tenders, and to assist in valuing completed work. Preliminaries in building industry is that part of the Bills of Quantities which describes the project and contract particulars, lists the contractor's general obligations, the works to be carried out, goods, materials to be provided, parties obligation and liabilities, and general facilities (Parkyn, 2002). Preliminaries are the associated expenses or costs that contractors incur in the completion of a project. This

may be the cost of a site office, hoarding or heating the site office, rather than the costs of the actual construction working materials. Preliminaries, which form part of the bills of quantities is normally priced by the contractor separately from the trade or elemental bills for the duration of the contract. Bills of quantities for building are divided into the following sections: preliminaries, preamble, measured work, prime cost and provisional sums. Hore, O'Kelly and Scully (2009) explain that the preliminary section in a bill of quantities contains three separate and distinct types of item, namely: items which are informative only and have no identifiable cost such as project parties; items which are not specific to any work section but have an identifiable cost, such as insurance; and items for fixed and time-related identifiable costs which derive from the contractor's expected method of carrying out the work, such as providing temporary accommodation.

The specification of any project, whether shown on drawing or written, usually consists of preliminaries and work sections. Together they describe what is required to complete the works in accordance with contract terms and conditions. The code of procedure which accompanies SMM7 for building works noted that preliminaries section has items that are not specific to work sections but have an identifiable cost which is useful to be considered separately in tendering. These costs may either be one-off fixed costs, such as the cost of bringing to site and erecting site accommodation (and subsequent removal) or time-related such as the heating, lighting and maintenance cost of that accommodation.

Typical items in preliminaries section

According to Martin (2004) the general items of preliminaries described in bill of quantities as provided in standard method of measurement of building works in order to make a fair valuation of building works are: preliminaries particulars (such as project and contract details, works, goods and materials to be provided by parties involved, as well as obligations and liabilities, etc.); plant, tools and vehicles; scaffolding; site administration and security; transport for labour; protection of work; water, lighting and power; temporary telephone; temporary roads, hard standings, crossings; temporary accommodation; traffic regulations; safety, health and welfare; maintenance of public and private roads; removal of rubbish, debris etc.; control of noise, pollution, etc.; statutory compliance and obligations; surety or performance bond; insurance; shop drawings, co-ordination and record drawings; progress photographs and reports; schedules, charts, etc. showing progress of trades works, activities; clearing cleaning and handover.

Employer's requirements and contractor's obligations

The standard method of measurement (SMM7) categorized the general items described in bill of quantities into two main parts: the specific requirements of the employer and the contractor's obligation which is the facilities to be provided by the contractor to carry out works. Singh (2002) described contractors requirement as items, facilities and services mandatory to be made available on site for smooth execution of works and listed the following contractor's general cost item needed to make a fair valuation of the works during the construction phase to include: setting up of management team and other staff such as site manager, general foreman, panning engineer, foreman, quantity surveyor, clerk/typist, and security/watchman. Ashworth and Willis (2008) categorised facilities and services to be provided by contractors to include: provision of power/lighting/heating, water, and other temporary works; telephone services; stationeries and office equipment such as computer, photocopier etc.; security and safety on site: either by security firm or own labour for watching site. Griffith (2003) listed the following required items in preliminaries to be provided by contractors: temporary works, site accommodation, attendant labour, and

miscellaneous. The miscellaneous include setting out consumables, pegs and profile boards, tapes and refills. For the employer's requirement, SMM7 requires among others the insertion of fixed and time-related charges relating to general conditions for subcontracting and supply of goods, general management, coordination, supervision and administration of works, arrangement of site meetings, quality control of materials and workmanship, safeguarding and protection of site and unfixed materials, as well as relevant insurances.

Pricing of preliminaries

According to Ashworth and Willis (2008) when pricing preliminaries always start with your supervision, site establishment, methodology of construction, access restrictions, plant and programme requirements. Submitting that, it will determine the basic plan of construction and reveal all the obvious elements to be priced. Davis and Love (2009) noted that preliminary items of bill of quantities are usually the most difficult to price and would produce the greatest variation in prices with each contractor having his own idea of pricing preliminaries. In order to get a fairly priced preliminaries, careful attention to detail is required as reading through the specification and guidelines might show some obligations to allow for the preliminaries. Pricing preliminaries probably requires more judgment than any other costs area. It requires that you have a clear understanding of what costs have been allowed within the rated work, what general costs will be required to run the site and what costs are allowed for within overheads. Some contractors with experience of a particular type of work allow a percentage for the preliminaries (excluding Provisional Sums, etc.) based on previous project. The percentage approach however, can be pruned to risk for less experienced contractors who lack an understanding of the cost involved (Tervo and Stewart, 2005). Fixed charges and time-related charges are two common approaches applied in pricing preliminaries A fixed charge according to Tervo and Stewart (2005) is for work items in which its cost is considered as independent of duration, these include setting out, provision of offices, stores, canteen, plants and removal of plants, offices and other facilities. If fixed, the lump is only payable when the work itemized is completed. Such items of work includes, delivery of plants to site, provision of offices accommodations, services installation, setting out of the structure and removal of plants, service and office. All these items have fixed charges as contained in the bill of quantities. Udegbe and Amadi (2009) posited that contractors should consider external factors such as change in government policies, general wages increment, inflation and government instability when pricing significant items as fixed charge. Time-related charge is for work the cost of which is to be considered as dependent on duration, where payments are spread out over the time taken to achieve completion of the work covered by the item (Tervo and Stewart, 2005). Such items of works have direct relationship with time involved in executing the work item. For instance, maintenance of plants, office accommodations and services are related to contract period under which project is been executed.

Materials and Methods

The paper appraised preliminary items of bills of quantities priced by contractors through the application of structured questionnaire to collect relevant data. The data collection approach was in two stages. The first stage which conducted a random sample of five (5) registered private liability firms operating as building contractors and have executed mass housing project in Kaduna metropolis, involved comprehensive interviews conducted for heads of the five firms. The responses obtained at the exploratory survey stage were utilized to design questionnaire which was later

administered to 50 firms who have executed mass housing projects in Kaduna metropolis in the last two years and obtained appropriate data for analysis.

The data was analysed by the computation of mean ratings (MR) of each variable using five (5) point Linkert scale. Total number of respondents (TR) rating each variable was obtained and used to calculate the percentage of the number of respondents associating a particular rating point (Rp). The mean rating (MR) was calculated as the summation of the products of each rating point (Rp) and the corresponding percentage response to it (R%) out of the total number of responses (TR) involved in rating of a particular variable as shown in equation 1:

$$MR = \sum_{j=1}^5 (R_{pi} \cdot R_i\%) \dots\dots\dots(1)$$

Where: R_{pi} = rating point ranging from 1 to 5.
 R_i = percentage response to rating point i .

Results and Discussion

Preliminary items in bill of quantities commonly priced by building contractors

Fourteen (14) preliminary items in bill of quantities which were commonly priced by contractors obtained during the exploratory survey stage are shown in Table 1. Results that contractors considered most significant in ensuring smooth progress of work on site were water, lighting and power with significant mean rating (MR) of 4.72; it was followed by site cleaning/clearance with the MR of 4.66; while transportation of workers to site with 2.76 rating is the least ranked among items of the priced preliminaries. The significant role of water, lighting and power in construction sites of mass housing projects cannot be over-emphasised, as it is the duty of contractor to provide water and temporary power in the site. Zune (2010) opined that providing water, lighting and power supply to site may require more cost than usual if the site location is distant from the main power grid, the need for standby generator, fuelling and maintenance would be required. Transportation of workers was least significant and ranked low because most of the recruited site labour workers are resident in neighbouring communities close to the building site.

Factors that influence the pricing of project preliminaries

Results in Table 2 showed that the most important factor was nature of the site with 4.68 mean rating and is ranked number 1. The nature of the site relates to the site topography and condition which contractors have to visit to determine if there is an existing supply (e.g., power, water) for building operation, the ground soil condition and also study the drawing specifications and tender document before the commencement of pricing. Location of the site was ranked second with 4.62 MR. Location of the sites relates to how easily accessible (by vehicles and on foot), secured and distant the site is from town and building material markets. This will help reduce the cost of transporting materials and men to site. Contract terms and conditions with 4.54 MR was ranked third. The Contract terms and conditions identify the form, type, conditions of contract, amendments to the standard conditions and appendix/schedule. It provides contractors with the opportunity to price all matters in connection with the contract arrangements. A key function of contracts is to allocate risks between the contracting parties if disputes are to be avoided. As Murdoch and Hughes (2008) pointed out 'contracts are drawn up with the intention of relying upon them in a court of law at some point in the future'.

Table 1: Relative significance of preliminary items of bill of quantities

S/N	Preliminary items (Variables)	Level of significance of preliminary items in BOQ					MR	RO	TR
		UN	NS	S	VS	MS			
		(1) %	(2) %	(3) %	(4) %	(5) %			
1	Site cleaning/clearance	0	0	8	18	74	4.66	2 nd	50
2	Site accommodation	0	0	10	20	70	4.60	3 rd	50
3	Insurance	6	10	24	40	20	3.58	10 th	50
4	Site communication and correspondence	0	18	36	26	20	3.48	12 th	50
5	Managerial/technical staff	0	0	24	30	46	4.22	7 th	50
6	Water, lighting and power	0	0	8	12	80	4.72	1 st	50
7	Site security	0	0	12	30	58	4.46	4 th	50
8	Site accessibility	0	0	20	36	44	4.24	6 th	50
9	Mechanical plant/Equipment	0	0	18	30	52	4.34	5 th	50
10	Hoardings and signs	0	12	44	24	20	3.52	11 th	50
11	Site progress photographs, reports and meetings	0	0	24	32	44	4.20	8 th	
12	Scaffolding, protection of work	0	10	40	30	20	3.60	9 th	
13	Safety and health	0	0	72	20	8	3.30	13 th	
14	Transportation of workers	0	44	40	12	4	2.76	14 th	

UN = Undecided; NS = Not Significant; S = Significant; VS = Very Significant; MS = Most Significant; RO = Rank Order; TR = Total number of Response

Source: Field survey (2016)

Table 2: Factors that influence pricing project preliminaries

S/N	Factors contractors consider in pricing project preliminaries	Level of importance of factors					MR	TR	RO
		UN	NI	I	VI	MI			
		1 %	2 %	3 %	4 %	5 %			
1	Availability of plant and equipment	0	0	18	26	56	4.38	50	4 th
2	Availability of resources to the contractor (e.g. technical staff, labour and materials)	0	0	26	24	50	4.24	50	5 th
3	Location of the site	0	0	12	14	74	4.62	50	2 nd
4	Nature of the site	0	0	10	12	78	4.68	50	1 st
5	Contract terms and conditions	0	0	12	22	66	4.54	50	3 rd
6	Commitment to other projects	12	20	18	30	20	3.26	50	10 th
7	Financial base of contractor	0	12	14	24	40	3.62	50	8 th
8	Project duration	5	10	25	40	20	3.60	50	9 th
9	Number and size of project	0	6	12	40	42	4.18	50	6 th
10	Prevalence of conflict and political stability in the area	0	12	20	28	40	3.68	50	7 th

UN = Undecided; NI = not Important; I = Important; VI = Very Important; MI = Most Important; RO = Rank Order; TR = Total number of Response

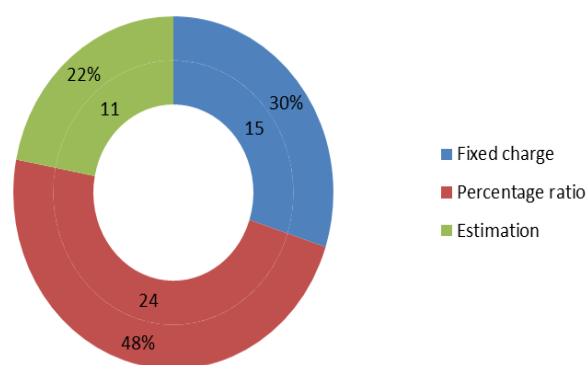
Source: Field survey (2016)

The contractual arrangements set out the obligations and rights of the parties and the detailed conditions under which the contract will operate. This enables contractors to make an allowance for risk in anticipating and undertaking construction work on site. Commitment to other projects is the least ranked factor with 3.26 mean rating. This factor impact on contractors not having enough time to price preliminaries effectively due to number of existing projects already committed to. Thus, compelling contractors to decide to price preliminaries on lump sum or by extract relevant information from their previous past project preliminaries.

Pricing project preliminaries methods

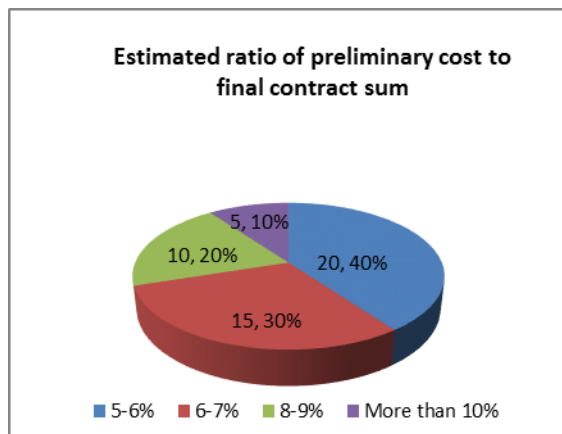
Results in Fig. 1, reveals that 48% of the contractors used percentage ratio method to price project preliminaries. Fixed charge method and estimation method was used by 30 and 22% of the contractors, respectively. This indicates that percentage ratio is the most used method of pricing project preliminaries by the contractors in the study area. This expresses the fact that most of the contractors consider preliminaries on projects (like off-site overheads) as a percentage of turnovers based on personal judgment, as Bu-Qammaz, Dikmen and Birgonul (2009) confirmed that contractors' usage of certain percentage total project for

project preliminaries due to their experiences in the field or by assumption has undermined their ability to carry out detailed estimation in pricing items contained in project preliminaries in bill of quantities.



Source: Field survey (2016)

Fig. 1: Project preliminaries pricing methods



Source: Field survey (2016)

Fig. 2: Contractors' estimated cost of project's preliminaries to final contract sum ratio.

Estimated ratio of cost of project's preliminaries to final contract sum

Figure 2 shows the percentage range of preliminary section allowed by contractors in their bill of quantities. 40% of the contractors allowed 5-6% of the contract sum as the sufficient amount of preliminary cost of a project. While 30% of the contractors allowed 6-7% of the contract sum as the sufficient amount of preliminary cost of a project, 20% and 10% of the contractors allowed 8-9% and more than 10% of the contract sum as the sufficient amount of preliminary cost of a project respectively. Tervo and Stewart (2005) submitted that the percentage approach is prone to risk for less experienced contractors who lack understanding of the cost involved. Therefore, the contractors' cost ratio of preliminaries and contract sum falls within the United Nation Educational Scientific and Cultural Organisation (UNESCO, 2008) reports which stated that on relatively small contracts, the preliminary costs may be in the order of 5 – 10% of the contract sum; whereas on complex contracts the figure could be much higher.

Conclusion

Since there is no specific rule or standard way for pricing preliminaries, it is therefore recommended that contractors should view project preliminaries pricing as a risk in contract sum estimation and approach it on the basis of their experiences in the 9999field as well as on well thought-out discretion of contractor managerial board. Efficiency done by contractors in the estimation of project's preliminaries can be a boomerang for them if they miscalculate the items in preliminaries. If the actual project's preliminaries are below the estimation stated in Bill of Quantities, then it will become the contractor's profit. And the opposite principle applies. If the actual project's preliminaries are higher than the estimation, then it will become the contractor's loss.

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