

Applicability Bill of Quantities in Construction Procurement

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ABSTRACT : *Bill of quantities (B/Qs) is an essential document in a construction project which provides the detail of the contract amount. Historically, the formal form of B/Qs was initiated in the United Kingdom after the Industrial Revolution in the 19th century. It was mainly used by contractors for paying their workers and claiming payments from clients by submitting it as partisan final account. Particularly, B/Qs is widely used in the traditional procurement for cost estimating and as part of tender and contract document. However, as construction industry evolved and changed technologically, economically, legally, and procedurally, sodoes the usage of B/Qs in the construction projects. It is not known whether B/Qs in its current format is suitable to be used with the more modern procurement systems or not. Based on literature, the issue on the declining usage of B/Qs due to the non-traditional procurement system adopted in construction industry has been encountered in the UK's, Australia's and also Malaysia's construction industry due to several factors. One of the common factors is due to complexity and time consuming in the preparation of B/Qs document. Thus, this article intends to develop strategies to close the gaps between B/Qs documentation in terms of format and style with the procurement system. Besides that, this article may establish the functions of B/Qs in the construction procurement system.*

KEYWORDS : *Bill of Quantities, construction, procurement system, tender document*

I. INTRODUCTION

B/Qs is widely used in the traditional procurement method for cost estimating and as part of tender and contract document. However, its use is beginning to wane because the application of non-traditional procurement system has become the norm. It is not known whether B/Qs in its current format is suitable to be used with the more modern procurement systems or not. This is because, based on literature, the issue on the declining usage of B/Qs due to the non-traditional procurement system adopted in construction industry has been encountered in the UK's, Australia's and also Malaysia's construction industry due to several factors. One of the common factors is due to complexity and time consuming in the preparation of B/Qs document. According to Rosli et al., (2006), the usage of B/Qs declined because of the complexity in the preparation of B/Qs documentation which consumes times. A Bill of Quantities or B/Qs is a complex document consists of qualitative and quantitative aspects of every constituent part of a proposed construction project such as items of works with complete description of material, workmanship, and the quantities, and compiled together with the form of tender, specification, preliminary bill and list of drawings to form a tender document (Hackett and Robinson, 2003; Chan, 2002; NSW Legislative Council, 1991; Marsden, 1998; Seeley, 1997; Willis, et al, 2002 cited in Rosli et al, 2006). Besides that, in traditional procurement method, B/Qs is a part of tender document and the preparation of B/Qs starts after the completion of detailed design. This process contradicts to non-procurement system which the tender document prepared during the development of concept design stage of the construction project.

Thus, this shows that, it is not known whether B/Qs in its current format is suitable to be used with the more modern procurement systems or not. Therefore, in order to ensure the effectiveness of B/Qs, this research intends to identify various types of B/Qs in terms of the format, style of presentation and method of measurement, factors that contribute to the constraints in the production of B/Qs, various types of procurement systems and establish link between B/Qs format, style of presentation, method of measurement with procurement systems. Hence, this research intends to develop strategies to close the gaps between B/Qs documentation in terms of format and style with the procurement system and at the same time establish the functions of B/Qs in the construction procurement system.

II. LITERATURE REVIEW

A Bill of Quantities or B/Qs is a document detailing the qualitative and quantitative aspects of every constituent part of a proposed construction project such as items of works with complete description of material, workmanship, and the quantities, and B/Qs is compiled together with the form of tender, specification, preliminary bill and list of drawings to form a tender document (Willis, et al., 2002 cited in Rosli, et al., 2006; Hacket and Robinson, 2003; Chan, 2002; Marsden, 1998; Seeley, 1997; NSW Legislative Council, 1991). Bills of quantities (B/Qs) has existed and developed over 300 years (Miliken, 1996). According to Rosli, et al., (2006), B/Qs emerged due to the emergence of QS profession. The QS profession was established as early as 1785 as a “measurer”, “custom surveyor” or “surveyor” but the first recorded usage of the term “quantity surveyor” was in year 1859 (ASAQ, 2006, cited in Rosli, et al., 2006). In Malaysia, the B/Qs is introduced and widely used as tendering and contracting purposes in the 1940s since the profession of quantity surveyor was introduced to this country (Rosli, et al., 2006).

B/Qs document is comprised of detailing description and quantities of all of the construction work of a project and the processes involved in the preparation of B/Qs document are “taking off”, drafting, checking, editing and printing the 300-500 pages (Rosli, et al., 2006).Based on Brook (1998), B/Qs has two primary uses (cited in Davis et al., 2004):

- a) Pre-Contract: B/Qs assists contractors in the formulation of their tenders as the BQs breaks down the contract works in a formal, detailed, and structured manner for tendering purposes.
- b) Post-Contract: B/Qs assists the contractors and quantity surveyors in the valuing of progress payments and variations and it provides a financial structure for contract administration.

However, based on RICS (1991) research, there is a declining usage of the B/Qs in the construction industry and it was predicted that B/Qs may totally disappear from the construction industry in the near future. In Australia, the Legislative Council NSW has already identified from year 1991, the need for continuing research and debated and advocated further research to establish whether B/Qs remains as an essential part of contract documentation prepared by the QS. According to RICS 1991, in UK, the use of B/Qs has declined from 65% in 1984 to 56% in 1989. Based on AIQS (Victorian chapter) survey in Table 1, it also indicates that a sharp downward trend in the production of B/Qs (cited in Davis et al., 2004).

Table 1: B/Qs Production as Percentage of Office Workload

1993	1994	1995	1996	1997	1998	1999
27%	30%	22%	16%	15%	17%	11%

Source: (AIQS Victoria, cited in Davis et al., 2004)

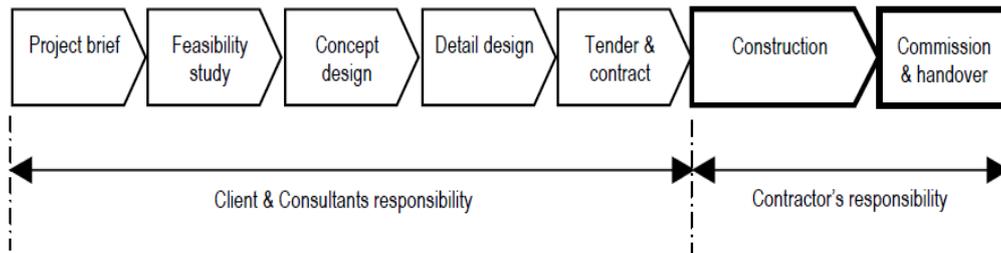
One of the possible factors that contributes to the declining usage of B/Qs in the construction industry is that, it is not fully utilized by the project team and many were not able to relate B/Qs for everyday project with the development process. AIQS, (2001), claimed that B/Qs is perhaps the most misunderstood facet of building contracts today. Moreover, the debate over the relative advantages and disadvantages of B/Qs has been long standing and generates strongly held and conflicting views (NPWC/NBCC, 1990). There are clear arguments for and against B/Qs, but very limited research to support them in which, many of the arguments are based on anecdote, intuition or common sense (Davis et al., 2004).In Malaysia, there is one research conducted by Rosli et al. (2006) pertaining to the B/Qs performance in today’s construction procurement system. They exaggerated that B/Qs is not necessarily useful for every type of project or procurement system and this is the main issue contributing to the declining usage of B/Qs in the construction industry in Malaysia. They claimed that this scenario is because of the processes of design, documentation and construction tend to run almost parallel to one another and the tendering process is much shortened.

However, for non-traditional procurement system, the contractors still have to prepare a document comprised of the concept design or schematic design and a proper cost document for bidding purposes and this document can be as detailed as to become a “concise B/Qs” but there is no specific term used for such document (Rosli et al., 2006).Therefore, the adaptability of B/Qs depends on the types of procurement system in traditional procurement and non-traditional procurement system where both processes involved are different. According to Odhigu et al. (2011), in traditional procurement system, the design and the construction are carried out by separate organizations and some basic characteristics of traditional procurement system are as follows:

- a) Project delivery is a sequential process.
- b) The design of the project is largely completed before work commences on site.
- c) The responsibility for managing the project is divided between the client's consultants and the contractors, and there is therefore little scope for involvement of either of the parties in the other's activities.
- d) Reimbursement of the client's consultants is normally on a fee and expenses basis, whereas the contractor is paid for the work completed on admeasure or lump sum basis.

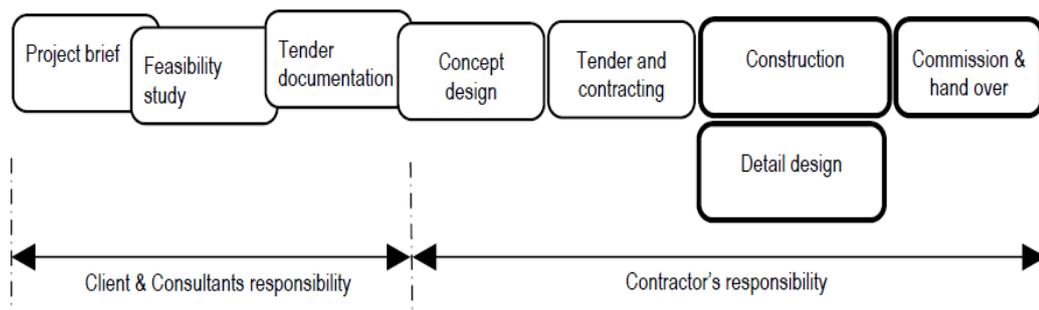
There are four stages of traditional procurement system which are preparation, design, tender and construction such as in Figure 1.

Figure 1: Traditional Procurement System



However, in non-traditional procurement system, the design and the construction are carried parallel as in Figure 2 (Rosli et al., 2006). Non-traditional procurement system is divided as integrated and management oriented procurement system, in which, integrated procurement system is Design and Build (DB), Package Deal, and Turnkey method whereas management oriented system is management contracting.

Figure 2: Typical Processes of Non-traditional Procurement System



Thus, in order to suit the B/Qs with today's construction procurement, the Construction Industry Development Board (CIDB) (2010) suggested that the B/Qs will be more effective if it;

- [1] Comprehensively and accurately reflects the nature of the work proposed and the circumstances under which it will be executed;
- [2] Is prepared in a standard manner for all contracts; and
- [3] Is brief and simple to use, while still being itemised in sufficient detail to distinguish between different classes of work, and between work of the same nature carried out in differing circumstances and locations.

III. RESEARCH ISSUES

Evidently, as the construction procurement changes from time to time, so does the adaptability of B/Qs. However, how far the declining usage of B/Qs is due to today's construction procurement and there is less concern on that. Therefore, the criticisms of B/Qs in which the preparation of B/Qs is very complex and time consuming must be taken in a positive manner and should be addressed professionally and scientifically. Moreover, it is not known whether B/Qs in its current format is suitable/appropriate to be used with the more modern procurement systems. Literature suggested that the use of BQ is on the decline where there are some complaints of the lengthy time taken to prepare them.

IV. SUGGESTIONS AND CONCLUSION

Bill of quantities is a document prepared by a quantity surveyor. Therefore, one of the significance of this research is it contributes to a body of knowledge in the quantity surveying field, both in practical and

education. The research may alert the construction teams on the causes of errors that occurred in a bill of quantities, so that it enables them to reduce the inaccuracy risk in such document. At the same time, it helps to minimise the problems pertaining to the bill of quantities for construction projects which have been mentioned by previous researchers through the review of literatures. Therefore, this research not only highlighted the errors and causes of errors in a bill of quantities, but it also touches on the effects of inaccuracy of a bill of quantities on construction projects. Hence, this is evidence that this document is very significant in a construction project. An accurate bill of quantities will fulfill the satisfaction of many parties such as the clients, contractors and others. On the other hand, the proposed strategies also contribute to the enhancement of quality of quantity surveying services. Moreover, the literature review on the basic knowledge of a bill of quantities such as definition, types, format, and processes involved during preparation of the document and the functions enrich or extend the current knowledge of the quantity surveying field and construction industry. In a nutshell, this research study is conducted to identify the errors and causes of errors in the bill of quantities document. Furthermore, this ongoing research also touches the effects of errors in a bill of quantities to a construction project which enables the researcher to propose strategies to minimize the errors in the bill of quantities document. The proposed strategies will not only enhance the quantity surveying services, but will also improve the construction projects works and teams satisfaction and contribute to new knowledge dissemination.

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