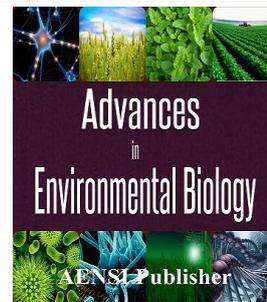




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### Problems in Heritage Building Conservation

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#### ABSTRACT

In Malaysia, conservation work is considered as a new expansion in the construction industry, thus the experience and the level of knowledge in conservation practices are still limited. Consequently, the industry is currently facing several problems that have caused cost and time overruns; and contractual disputes during the post-contract stage. The problem lies in several aspects such as the different sequences of work, lack of standard guidelines in carrying out the works, lack of technical knowledge, the need for specialist work, incomplete survey information, limited design information, insufficient cost information, limited building materials and different specification required for conservation works as compared to new building works. However, based on the literature, there are many publications that focused on pre-contract stage but literature on post-contract stage is limited. Therefore, the researchers aim to expand this paper for the thesis writing that focuses mainly on post-contract stage through case studies and interview sessions by having several research questions and objectives.

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### INTRODUCTION

According to the Burra Charter [1], conservation means all the processes such as maintenance, preservation, restoration, reconstruction and adaptation; or a combination of more than one of these; to look after a place in order to retain its cultural significance by making use of all knowledge, skills and techniques. Conservation works involve both repairing and upgrading works and require understanding of building material; appropriate choice of tools and specification; introduction of new technologies; and compliance with the regulations [2].

Building conservation work involves various professionals and expertise such as town planners, conservation architects, landscape architects, quantity surveyors (QS), specialised engineers, building contractors, archaeologists, art historians, craftsmen [3,4], antiquaries, chemists, geologists, biologists, urban designers [3], conservator, materials scientist, surveyors, curator and including the owner of the building [4]. All the parties involved should have a broad and mutual understanding in buildings conservation works [3,5] in order to carry out the same conservation approach in each project. If this mutual understanding is not achieved, many problems may occur throughout the conservation works because they are more complex and involve non-standard work that are different from new building construction processes [6].

#### *Problems in heritage building conservation:*

Since heritage building conservation is still new in Malaysia [7], there are several issues and problems that arise during the conservation works. This happens because conservation projects are unique and do not have past cases to study [8]. It is also due to the lack of specialists in building conservation works. According to Mansfield and Reyers [9], the nature of conservation projects largely depend on the professionals involved as the risk is higher than the new building works due to the problems from the original structure [8]. However, in current conservation scenario, there is limited number of technical experts and skilled labour, as well as the lack of technical knowledge [2].

Various authors have identified the issues and problems that usually happen throughout the conservation projects. Starting from the beginning of the project, Zolkafli et al. [8] found that survey information is inaccurate and incomplete. Structural information of the buildings such as reports, as-built drawings and

manuals are not properly documented, incompleting or missing [2]. Besides, the available information is inaccurate due to the modification made throughout the life span of the buildings were not recorded [2]. Therefore, it is difficult to understand the nature of building defects which may lead to cost overruns through an inappropriate approach of repairing work [10]. This is due to the difficulties in obtaining information with suitable technique for the heritage documentation [11] whilst it is important to avoid misunderstandings and adverse outcomes [12]. According to Ahmad [13], there is no suitable system in discovering and recording the processes of heritage building conservation, which may affect the task of diagnosing building problems in the future [14].

As stated before, guidelines on conservation works are still lacking, insufficient and unsuitable [13,15]. The building legislation keeps changing and updating [16]. Usually, new information is discovered during the conservation period, which leads to the change in design [2]. These will affect the design building approval process [16] as the designers have to modify the design in order to comply with the changing legislation and taking into account the new information obtained. It is also because of the too bureaucratic and slow approval process [8]. Besides, the designers are also not able to complete the design before construction due to the limited design information [17] because of the fragmented and uncertain condition of existing buildings in refurbishment projects [18]. The design process may affect the project performance [19]. Due to the limited and inaccurate design information [16,17,19], designers make assumptions that lead to a large number of variation orders during the construction stage [19].

In terms of costing, Smith [20] stated that preparing cost estimates for conservation works is complex and difficult. Since conservation works are different from new building works, the QS cannot use the same analysis format when preparing cost estimates for conservation works [21]. Preparation of bills of quantities (BQ) is based on building defects diagnosed from the dilapidation survey [10,22]. According to Shamsulhadi and Fadhlil [23], there are eight categories of problems regarding the preparation of BQ which are inadequate information; unreliable and inaccurate rates and quantities; poor and unimproved production technique; unimproved format; limited function; poor and unimproved presentation; failure to recognised builder's knowledge; and unable to fulfil the current demand of construction environment. These problems occur due to the limited cost information for conservation works [8,21] to prepare a build-up estimate, proposed cash flow, and contract procedures [6]. Tender documents should contain all information on materials, labour, equipment, condition of building, site investigation, dilapidation survey reports, other survey reports, drawings, and specifications [6]. However, due to the limited information, the documents might be incomplete and not well-prepared. Because of these ill-prepared documents, other problems may occur during the post-contract stage, such as cost overruns and contractual disputes [6].

During the construction stage, the most common problem is regarding the availability of materials [8]. Traditional materials are preferred in conservation works [24] but they are limited due to the change in response to economic, environmental, and occupational safety needs [12]. However, new materials can still be used to replace defective old materials and must be of the same type and species [25].

A conservation project should be maintained from time to time in order to prolong the building's life span. However, most buildings do not have any specific or planned maintenance program to protect them [26]. The most common problems regarding maintenance management are building ignorance, illegal renovations, not complying with legal requirements, difficulties in repairing and maintenance works, lack of enforcement of building control aspects and building intrusion threats [26]. This happens due to the absence of standard specification [27] and lack of knowledge in repairing and maintenance [13,28].

#### *Discussion and Conclusion:*

The review of the literature shows that there are many research carried out on pre-contract stage but the literature is limited on post-contract stage. As in the previous section, the literature on pre-contract stage includes the beginning of the project, the dilapidation survey, the design process, cost estimation, BQ preparation and tender document preparation; while the literature found on post-contract stage is only on the variation orders and material availability during the construction stage. The researches by Yin and Mui [6], Woon and Mui [21] and Shamsulhadi and Fadhlil [23] are the examples of researches on pre-contract stage which focus mainly on BQ and tender document preparation which are very important in pre-contract stage. However, there are limited publications that thoroughly discussed on the post-contract stage activities. The literature found on the post-contract stage was limited to the point that the information is still lacking and insufficient. With its complex nature of works, both pre-contract and post-contract stages are important in each building conservation work. Problems that occur in the pre-contract stage may affect the post-contract stage and lead to bigger problems in the future. Therefore, the professionals involved in conservation works should have accurate and adequate knowledge and experience in both stages in order to minimise the occurrence of the problems throughout the works. From the beginning of the work, they involved in the dilapidation survey, then in the design process. Their involvement in the design process is crucial to ensure high degree of completeness of designs before the commencement of work [18]. The contractor chosen should also have sufficient

experience in conservation work as it requires high technical skills and expertise [25]. In the construction stage, all parties are involved in the decision making, especially the architects and contractors [18]. However, the architects' roles as team leaders remain important in this stage to monitor and report the progress and quality of work, while other parties are involved as there are many changes in design due to new site discovery [18]. Therefore, the employment of knowledgeable and experienced professionals is very important because any wrong decision made due to the lack of knowledge and experience may lead to bigger problems throughout the works.

There are many issues on the post-contract stage in building conservation works that need to be properly understood such as: variations, payments, loss and expenses, extension of time and final account; as well as, contract implementation, project performance, progress meetings, monitoring stage, project delays and cost overruns. Therefore, this paper aims to extend the previous studies on pre-contract stage to post-contract stage from the aspect of QS through case studies and interview sessions by having several research questions such as "What if the QS involve since the beginning of the project?", "What kind of knowledge is still lacking?", and "How can the knowledge obtained help to reduce the problems that occur during the post-contract stage?". These questions are set up to meet the objectives of the research which are to study the level of involvement of QS in the post-contract stage; to determine the type and level of knowledge of QS in post-contract stage; and how their knowledge and involvement affect the project delivery process.

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