Rajapaksha.U, et al (eds), 2015, "Making built environments responsive"*: Proceedings of the 8th International Conference of Faculty of Architecture Research Unit (FARU), University of Moratuwa, Sri Lanka,* pp. 118–130. ©

ANALYSIS ON PROCUREMENT SYSTEMS FOR ALTERATION BUILDING PROJECTS IN SRI LANKA

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Abstract
Alteration building is an emerging concept with growing interest in Sri Lankan construction industry pertaining to building renovation and building refurbishment to get effective and efficient out come to their existing buildings. Any additional work, removal work or changes in the external parts of the building structure as well as any modification works of surface texture, architectural details or materials can be regarded as building alteration works. Success of this concept depends on many factors, where the procurement is one of that. It has been identified that the selection of an appropriate procurement method could reduce construction project costs by an average of 5 percent. Thus, this study was conducted to identify the strengths and weaknesses of procurement systems used for building alteration projects and determine the suitable procurement system. Three alteration building projects were selected for in-depth analysis of procurement systems and SWOT analysis were utilised. Findings revealed that the traditional procurement method as the most suitable procurement system for building alteration projects in Sri Lanka. Reduce conflicts, providing high quality output, cost saving, profitable for both contractor and the client were the strengths and unsecured client's initial price and increase completion time were the weaknesses of said procurement system.

Keywords. *Building alteration - Building projects - Construction industry - Procurement systems*

1. Introduction

The construction industry, undeniably a unique environment and by definition is a creative concept is one of the backbones of any country's economy (Ratnasabapathy & Rameezdeen, 2007). No single project is the same as another and the diversity breeds novelty and innovative problem solving at the practical level. Even though with its magnificent

characteristics, it has been criticized for its adversarial culture and lack of performance (Kaka *et al*., 2008). Construction Industry engages in a variety of building sites including building renovation, efurbishment and new constructions.

Alteration means the physical changes such as additions, removals and modifications to a building or plans as a permanent work not physically expanding the existing property (Barron's Real Estate Dictionary [BRED], 2008). United States Access Board (2010) has defined alterations as an amendment in a building or facility that affects or could affect the operation of a building or facility or portion thereof, while National Institute of Health (2012) has construed it as any upgrading or amendment to an functioning property to permit its sustained or more efficient use within its designated reason (Renovation), or for use of a diverse reason or function (Alteration). The common goal of alteration projects is to achieve the facilities standards of new projects in existing works. Renovation designs must gratify the immediate residence needs and anticipate other future changes. As they are altered, building systems should become more flexible and adaptable to varying occupancy requests (US General Services Administration, 2015). Accordingly, alteration projects are categorized at three fundamental scales: refurbishment of an area inside a building; major renovation of an entire structure; and upgrade/ restoration of historic structures.

Consuming a building for a long time period create problems of social and economy. Building owners suffer a lack of income due to long-term vacant building and high vacancy rates create a negative attitude of investors about market conditions. Occupants living in older buildings with a life time of more than 35 years are more likely to undertake a major renovation on their homes as depreciation becomes a major issue when they are going to sell their own buildings (Nair, Gustavsson, & Mahapatra, 2010). Therefore, both owners and investors tend to implement alteration concept in their projects (Remoy & Wilkinson, 2012). "Now, the trend of alteration on an existing stock has become more and more important. This should provide an opportunity to enhance the social, economic and environmental performance of the property and community as required in many sustainable development concepts" (Isnin, Ramli, Hashim, & Ali, 2012, p.02).

Projects can be defined as a combination of activities which are placed along with specified objectives and limited resources (Bakar, A.H.A. et al. 2011). Thus performance of the project is measured in terms of time, cost and quality evaluating the importance of secondary factors such as budget availability, client satisfaction, proper project management, procurement type and several other unnamed factors (Alias, Zawawi, Khalid, Aris & NM, 2014). Among them selection of the suitable procurement system is critical

for project success (Kumaraswamy & Dissanayaka, 1998). It has been estimated that the selection of an appropriate procurement method could reduce construction project costs by an average of 5% (Alhazmi & McCaffer, 2000). Griffith (2007) have identified the key considerations focusing on obtaining better value in procurement in alteration buildings, which are the function of building estate, financial relationship to the major business, location and the client's activities. Various researches have been conducted on identification of most suitable procurement methods for different types of constructions except alteration buildings. Turner (1997), Peek (2006), Singh (1990), Hashim,Yuet, Yin, Hooi, Heng& Lee (2006) have discussed how the procurement system is affected in general construction works.

Previous researches have revealed that price certainty, responsibility, risk avoidance, price completion, quality level, complexity, controllable variation and time as the main factors to be concerned when selecting a procurement method which can vary according to the nature of the project, executing time, role of the client and other important criteria (Najeeb, 2005). Even though researches have been conducted regarding other types of constructions, less literature is available relating to building alteration where none has discussed about analysis of procurement system for the building alteration projects. Therefore, this research intends to identify "what is the behaviour of procurement systems of the building alteration projects in Sri Lanka?" which is a visible gap prevailing in sustainable construction industry.

2. Building Alteration

Building alteration works can be defined as any additional work, removal work or changes in the external parts of the building structure as well as any modification works of surface texture, architectural details or materials (Isnin *et al*.,2012). Accordingly, refurbishment of an area inside a building; major renovation of an entire structure; and upgrade/ restoration of historic structures are the three fundamental scales of building alterations (US General Services Administration, 2015).

Alteration design should satisfy the initial occupancy needs and also anticipate additional future changes. Alteration model should be more flexible and the aim of the alteration should be to convince the new requirements within the parameters and constraints of the existing systems (Carol, Chan & Daniel, 2011). According to The Port Authority of New York & New Jersey (2013), to add comfort and enhance value of the building is one governing reason for building alterations. Building owners are changing internal parts to increase the comfort of living and increase the

value of money. Due to development of the world and attitudes of people, nowadays most of the historic buildings are tend to change by the building owners. Due to lack of spaces in urban areas, people alter their existing buildings to get new look and value for the buildings.

Alteration building works can be classified under two main categories, as major alteration and minor alteration. Under major alterations, Type 1 and Type 2 are the main sub categories while alteration Type 3 is the main category under minor alteration section (The Port Authority of New York & New Jersey, 2013).

Alteration Type 1

- Commonly use when there is a change in maximum number of occupancy, changes the occupancy or use group of a space or changes the description of a space. Examples- Converting from commercial to residential, interior conversion of the building or a space within a building due to a building addition. Required approval of registered architect or licensed engineer.

Alteration Type 2

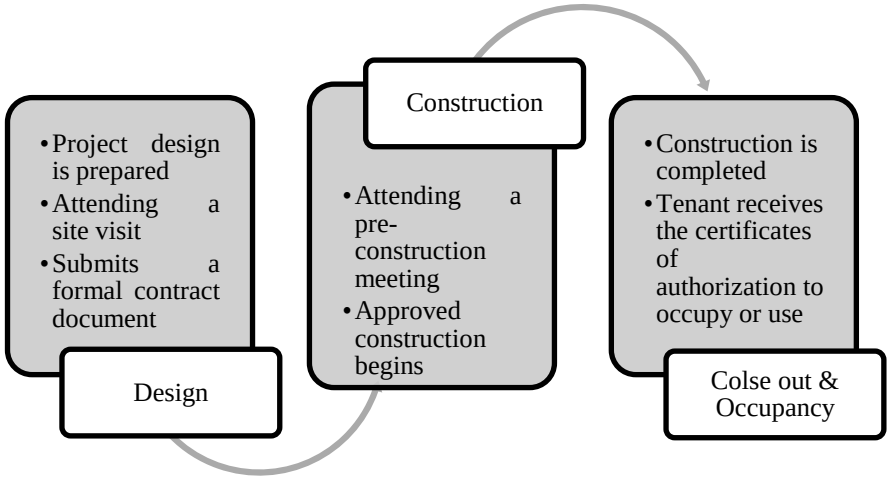
- Commonly use in renovation of commercial tenants and it will not change the building use, exits or type of occupancy.
- Does not change the use or occupancy of the building but requires several types of work, such as plumbing and construction. Required approval of registered architect or licensed engineer.

Alteration Type 3

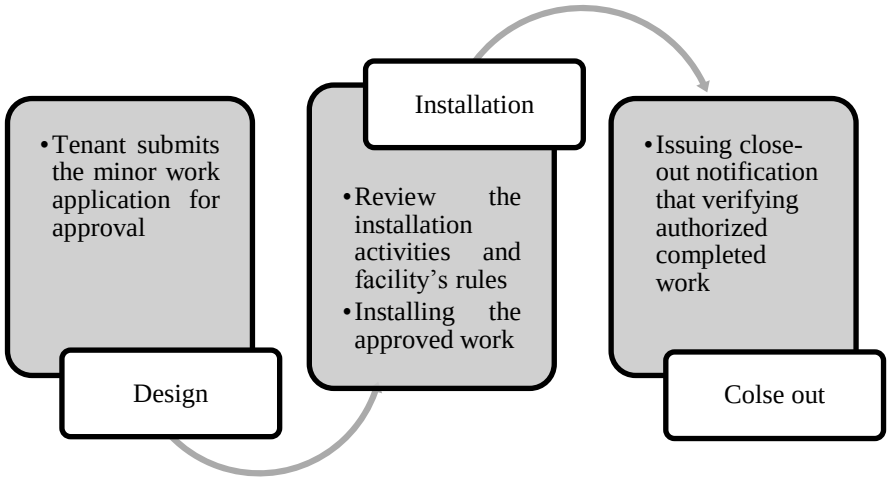
Doesn't require detailed plans and professionals. Examples- Curb cut, Constructing fence

Most of the alteration works in Sri Lanka are not very complex. Therefore the proper alteration process is not regularly using in alteration works. However, in complex alteration works, as it is engaging with more planning works and complies with law, a proper procedure should be followed to ensure safety. Different alteration processes have been identified for both major alterations and minor alterations separately (The Port Authority of New York & New Jersey, 2013).

Major alteration process has been discussed as following stages.



Minor alteration process has been explained in following stages.



Thus it is significant that major alteration process differs from minor alteration process from the initial step itself. No formal contract is prepared for minor works only application is submitted for approval. Moreover

alteration process as a whole totally differs from normal construction which has 11 different steps according to RIBA plan of work 2007.

In order to govern the alteration process effectively, procurement is acting a critical role in construction projects. Each project is having special characteristics and it is a must to treat the project considering appropriate procurement systems which expose the attainment of the project objectives (Hashim, Yuet Li, Chu Yin, Hooi, Heng & Yong, 2006). Suitable procurement system will always provide a good chance to get project success from the start and toward the end of any kind of construction works. The importance of the procurement system is to determine the degree and the relationship between the clients, designers and other project participants in each and every stages of the project (Alhazmil *et al*., 2000).

Different kinds of procurement systems have been involved in different levels of performances. Procurement has been developed due to several reasons, such as enhancement of complexity and magnitude, crossing national and natural barriers, innovative modalities. "These present prospective clients with many possible procurement paths within the complex network of potential arrangements for procuring design, construction, and management and financial services" (Kumaraswamy *et al*., 1998, p.224).

Significant changes in the technical and the economic conditions have been occurred in construction industry in recent past developing new procurement systems causing changes in clients' basic requirements and other identified factors by the researchers in the past for successful completion of a project (Jayasena, 2009). However those factors have not been addressed with respect to the alteration building constructions.

3. Methodology

The aim of this study was to identify the behaviour of procurement system for alteration building projects in Sri Lanka. Case study approach was selected as the appropriate methodology to this study. Multiple cases have been selected to provide multiple sources of evidence and potential replication of findings. The unit of analysis of this research was building alteration projects. Three cases have been selected for analysis with Alteration Types 1 and 2 which are major alteration works which is the limitation of the research.

Semi-structured interviews were carried out among related professionals based on their past experience to formulate solutions to understand the behaviour of procurement systems in selected building alteration projects.

Table 1: Cases Profile

Type	Case A	Case B	Case C
Alteration type	Alteration Type 2	Alteration Type 1	Alteration Type 1
Project cost (Rs)	56 Million	65 Million	80 Million
Project duration	15 days	6 months	8 months

Table 1: Experts Interviewee Profile

Case	Reference	Area of expert
A	CA1	Project executive (Refurbishment)
B	CB1	Project QS
C	CC1	Project QS

Qualitative cross case analysis was used for data analysis to understand the behaviour of Procurement systems for alteration building projects. The process of cross-case analysis is the comparison of commonalities and difference in the events, activities and processes that are the units of analysis in case studies (Samia & Robert, 2008).

Factors influencing the successful completion of the projects were identified and later strengths and weaknesses of each case were recognised and compared with each other and analysed the behaviour of procurement systems in the building alteration projects in Sri Lanka. Even though previous researchers have identified cost plus fee as the better procurement system for small building works, as it has not been specified to alteration building projects and due to difficulty in finding projects with a considerable budget and cost details following cost plus fee as procurement system this research has selected projects with traditional measure and pay procurement method.

4. Findings

Data collected through semi structured interviews revealed that it is essential to have a proper procurement system in alteration building projects to improve good quality works and to take new ideas on-board while maintaining good relationship with different stakeholders.

Having a proper procurement system creates a good relationship between all the parties involved to the contract. A party may demotivate if the procurement selection risk is more towards their side. It will directly affect to the quality of the work. In this research all the three selected cases have used Traditional Measure and Pay procurement system. According to the

interviewees Traditional Measure and Pay procurement system is the most commonly used procurement system in building alteration projects in Sri Lankan context. Contractors are willing to select this system on their projects due to higher variations involvement in alteration works. When compared to Traditional Lump-sum or integrated procurement systems, contractors are allowed for more variations in Traditional Measure and Pay procurement system and that has been the major reason for selection of that type in building alteration projects frequently by contractors. However, it is impossible to use Traditional Measure and Pay procurement system in all times. Alteration works consider parts in item wise, and therefore several parts could not be measured easily. It is the main difficulty in adopting Traditional Measure and Pay procurement system in those kinds of projects. Some projects have involved with a large number of demolition works and some items that could not measure easily and for that kind of projects it is better to integrate Traditional Lump-sum or integrated procurement systems, rather than adopting Traditional Measure and Pay procurement system.

Literature reveals (Ratnasabapathy et al., 2006), that the Traditional Measure and Pay procurement system is the commonly used procurement system for construction works in Sri Lanka which was supported by the findings of the research.

Identification of factors that are affecting the procurement process in a particular project is a crucial aspect. Figure 3 displays the factors affecting selection of procurement system and the level of influence in selected three projects.

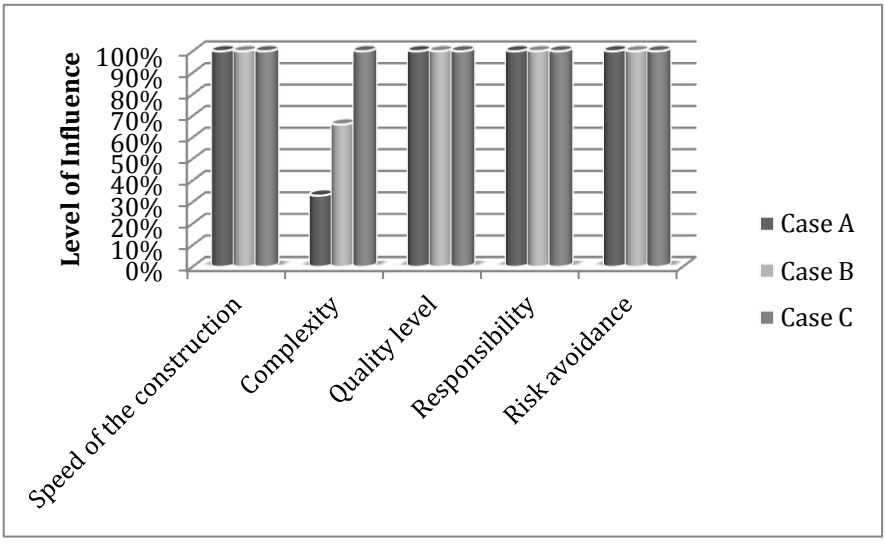


Figure 3: Factors affecting selection of procurement system and level of influence

According to Figure 3, affected factors in all three cases are almost same to the identified factors in literature. According to the three cases, above mentioned factors were common to the alteration projects as well.

In all three selected cases were concerning the speed of the construction in procurement selection. Alteration building projects normally engage with less time duration compared to new construction works. However, even the speed of the construction is a concerning factor in alterations, all three cases were used Traditional Measure and Pay procurement system which is not suited for a speedy construction. Quality work and less allocation for extension of time were the client's main requirements of all three cases.
The main reason for complexity on alteration building projects is due to modern techniques and modifications to the existing buildings. The modern architecture is used in alterations to provide a good aesthetical appearance to the building. Most of the times existing structure is not changing in the alteration projects, only the additions, removals and modification works are affecting in alteration process. However, case C uses Traditional Measure and Pay procurement system even it was a complex project. The main reason for the above cause is that, cost might increase if it is a Managing Contract procurement system which is more suitable for complex nature. But as client is always concerning the project cost engaging in Traditional Measure and Pay procurement system is a better solution for even a complex project.

Quality of the work is a highly affected factor in alteration building works. Further, one of the most important aspects is to identify client's requirements when selecting a procurement system for the project. Provision of dominating client in alteration building projects is relatively higher than the other constructions. Therefore, quality level is a critical factor when selecting the procurement systems in a project. Quality level is a governing factor especially in alteration building projects. The client's expectation in alteration projects is to increase clients' income or the profit by increasing demand for the existing building. Through the findings of the three cases, factors which were included in the literature synthesis were also proved further.

In any kind of construction project, responsibility should be taken regarding all stakeholders who are involving in the contract. In early stages onwards contractors are involving in decision making process in alteration building projects. Responsibility can be shared in reasonable provisions by involving contractor in the early stage of the contract. In alteration works, it is important to engage with different parties to both design and construction works separately. Therefore the both parties are responsible for their works and it will help to complete the work successfully. Through the findings of

the three cases, factors which were included in the literature synthesis were proved further.

Mitigating conflicts when selecting the procurement system for an alteration project is always a plus point which directly affects for completing the project effectively. When it comes to alteration works, it is always good to have less conflict procurement method in the contract. Through the findings of the three cases, it was identified that alteration building projects prefer Traditional Measure and Pay procurement system.

From the initial stage onwards every party who are involving to the contact, have to face different kinds of disputes and arguments. Minimum disputes leads to a good quality effective outcome for the client. Case A is not a complex project and therefore, possibility of having large number of disputes in that kind of low complex project is very low. When compares to Case A, Case B is a kind of complex project. One of a main reason to follow Measure and Pay in their project was to minimize disputes while engage in construction. Traditional Measure and Pay procurement system is a flexible method when compared to Traditional Lump Sum and other procurement methods. Alteration works always difficult to predict quantities and therefore, selection of Traditional Lump Sum is a considerable risk for the contractor. In case B, consultant and the contractor have completed the work in a friendly manner. All the three cases were concerned about the quality of work while Case A was a restaurant project and Case B was converted to a shopping complex. Therefore, good aesthetic appearance was expected by the client.

Quality of the work was a governing factor in case A. In Traditional Measure and Pay procurement system, client was directly involved to the design stage and the designs were required to fulfil client's requirements. Project cost is an important factor that all the clients are concerning in a particular project. In above three cases client has used competitive tendering to select the contractor on their projects. Selecting the lowest bidding price was an advantage to the client. When it compares with integrated arrangement, most of time contractors are selected through negotiations. Therefore, the client has to agree the contractor's price and that price is not the lowest when it compares to competitive tendering price in Traditional Measure and Pay procurement system.

In the contractor's perspective, selecting Traditional Measure and Pay procurement system is a profitable approach when it compared with other procurement types. The reason is possibility of misjudging the quality in alteration building works due to high involvement of variations and extra works.

After analysing the three cases, the following advantages can be zoom out in using a Traditional Measure and Pay procurement system in building alteration projects in Sri Lanka;

- Very less in arising conflicts
- Providing high quality out put
- Cost saving method
- Profitable for both contractor and the client

However, while having advantages of the Traditional Measure and Pay procurement system, there were few drawbacks affecting this system as well. By analysing all the cases, the major drawback is in adopting for Traditional Measure and Pay procurement system is, the client's initial price is not secured. In alteration works, variation cost and the extra work cost is significantly higher than when it compares to other construction types. In Traditional Measure and Pay procurement system, the contractor aware that he is paid for the work which has been carried out. When considering other disadvantages, time consumption for the completion of work is higher in the Traditional Measure and Pay procurement system comparatively to other procurement systems. Design and the construction are not overlapping in Traditional Measure and Pay procurement system. Construction works initiates when the design is finalized. Therefore, the completion time is higher in the Traditional Measure and Pay procurement system because the designing time and the construction time are acting separately. After analysing the three cases together the following disadvantages can be obtained in using a Traditional Measure and Pay procurement system in building alteration projects in Sri Lanka;

- Client's initial price is not secured
- Time for completion is high

Thus it has been identified that behaviour of alteration building projects differ based on the procurement systems used.

5. Discussion

In alteration projects, client's expectation is mainly focused to the quality of the works. The reason is client is altering the existing building to have a better earning with his owned property. Therefore, the quality of the work needs to be increased. Additionally, client is always preferred for cost saving methods to make full use of his financial commitment. Furthermore, not only the client, but also the contractor expects profit in the works and they prefer minimum risk affecting contracts on their side. Always the final output is more efficient when the conflicts are getting lower in parties who involve to

the contract. If a procurement system could satisfy those factors, even the high completion time and the unsecured client's initial price would be a useful system for an alteration building project. According to professionals' opinions and the analysis of the strengths and weaknesses of three cases, it can be concluded that the behaviour of alteration projects differ depending on the procurement systems used for building alteration projects in Sri Lanka.

6. Conclusions

Building alteration is a new concept for Sri Lankan construction industry. Unlike other construction works, studies were very less regarding the alteration constructions. In all kinds of construction works it is important to select a proper procurement system in those projects. In selecting those procurement methods, various factors were affecting in selection process of the suitable procurement methods. In this research, it has been identified that speed, complexity, quality Level, responsibility, risk avoidance and price completion were the most affected factors when selection a procurement system in a general construction project.

According to the selected cases, Traditional Measure and Pay procurement system was the commonly used procurement system in building alteration projects in Sri Lanka and the reasons for the selection is very less conflicts, high quality output, cost saving and profitable for both contractor and the client. Some drawbacks also have been identified as client's initial price is not secured and time for completion is high. Suitable procurement system was finally identified by critically compared strengths and weaknesses of the procurement systems that were used in selected cases. By analysing and comparing the selected three cases and according to the literature, it can be recognised that behaviour of alteration projects differ depending on the type of procurement system selected for the project.

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