RISKS IN CONSERVATION PROJECTS

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ABSTRACT

Conservation projects normally involve work that cannot accurately predetermine in terms of extent, specification, duration or cost. It was because conservation projects were unique and non-duplicate project which do not have precedent case to study. It was also fewer specialists in the sense of knowledge about the conservation projects. The aim of the research was to identify the risk in conservation faced by contractor and consultant at pre-contract and post-contract stage. The objectives of study were to identify the type of risk in conservation such as cost risk, time risk and safety risk. The barriers in the conservation refurbishment works also been identified through study. Finally, various possible solutions to reduce risk in conservation refurbishment works been identified. Questionnaires and interviews were conducted to achieve the objectives of the study. Both methods were used to cross-tabulated each other to reinforced the opinion from the practitioners. It was found that risk in conservation refurbishment work was higher that new-built projects. Besides that, it was found that risk management in conservation refurbishment projects had been poorly applied and practiced nowadays. Conservation works was contribute to a new era and ways in construction industry which can helps in growth of country's economy and to preserve the ancient's properties from time to time in order to attract more tourism visit our country.

Keywords: *Risk Management, Risk assessment, Conservation, Pre-contract, and Post-contract*

INTRODUCTION

Referring to the ISO 31000[1] , risks management can be defined as the assessment, identification, and prioritization by economical and coordinated application of resources to minimize, control and monitor the probability or impact of unfortunate events happen or to maximize the most safety and stable condition. On the other hand, Chapman and Ward (2003) defined risks management as an uncertain event which will occurred or a set of circumstances that, should it occur, will have an effect on the successfulness on the project's objectives. Chapman (1991) has defined risks as "exposure to the possibility of economic and financial gain or loss, injury or physical damaged, or delay as consequences of uncertainty associated with pursuing a particular course of action". This can be more understanding as

Risks= Probability of event * magnitude of loss/ gain

Those definitions have the common understanding of risks to achieve project's objectives and consequences to produce a series of solutions to improve performance or lower the risks through systematic strategic and solution named risks management plan. From definition risks quoted, risks basically related to something that cannot be calculated, measured, or exactly known the value from a project.

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[1] Standards relating to risks management codified by the International Organization for Standardization.

Boothroyd and Emmett (1996) identified and related the risks as a natural part of construction environment and is complex, even in new build construction. Apart from that, John R. and John Mansfield (2001) state that conservation refurbishment projects potentially contain more technical and economic uncertainty than new builds projects. Thus, we can conclude that in construction industry even in conservation projects contains its own risks which will influence the smoothness and construction methodology for every construction projects.

A purely definition of conservation is a carefully preservation and protecting of something from being getting an occurrence of improvement by virtue of preventing loss or injury or other change. Conservation projects can classified to difference categories which are preservation, restoration, rehabilitation, and refurbishment.

Thus, it will concentrate on the risks assessment in conservation refurbishment projects. According to Burden (2004), conservation refurbishment means to bring an existing building or structure up to its standard level or in good condition or to make it suitable for new use by renovation, or by installing a new fixtures, equipment, furnishing and finishes. On the others hand, Highfield (2000) stated that building refurbishment is a part of repair, extension, and restoration. Whereas Mansfield (2000) stated that the purpose of refurbishment is to gain more advantages or beneficial use of an existing building. Hence, from the quote, we can conclude that conservation is bringing an existing building to be in good purposed and used.

According to Reyers and Mansfield (2001a) stated in conference papers, conservation refurbishment projects normally involve work that cannot accurately predetermine in terms of extent, specification, duration or cost. It is because the conservation projects are unique and non-duplicate project which do not have precedent case to study. It is also fewer specialists in the sense of knowledge about the conservation projects. Hence, the risks management is important in the initial stage of conservation projects. According to J. Reyers and J. Mansfield (2001a), conservation refurbishment work is a highly specialized area of activity, particularly in all aspects of scheme design. This is because the increased risks and uncertainties in such project can disrupt the original requirement for price certainty, completion date and quality required. The specialists can help the client ameliorate the risks through the use of objective risks identification and management techniques that have become a needs component of the project design and management process.

Normally, conservation refurbishment project is more economic and technical uncertainties and risks than new-build schemes. Hence, commonly conservation refurbishment projects are invested with a greater amount of expertise or specialist input and craftsmanship. Yet it can be proved by Boothroyd and Emmett (1996) indicated that conservation refurbishment projects are more risky than new-build. The purposed and benefits when doing conservation project as follow:

- The client gets the building sooner, and begins to earn revenue earlier.
- The shorter the development period, hence save cost in term of financing scheme.
- The shorter the contract period reduces the inflation on building cost.
- Lower total costs compared to new-build
- Retain the original ancient tradition such as Melaka's building

Meanwhile if the building which is going to be refurbished is a historical building, it can give more advantages as below:

- Preserving the architectural character and the integrity of the building
- Keeping the past historical value and aesthetic of the building
- Help the country to earn more income by attract heritage tourism to the country

PROBLEM IN CONSERVATION REFURBUSHMENT

In construction industry, each conservation refurbishment project is view as a unique and non- duplicate project which is hard to find any example or similar project with it. Basically, the conservation refurbishment work is doubled and more complicated to handling than the works of new-build due to the constraints imposed by the original structure. Risks assessment is therefore, vital for conservation refurbishment projects as the design information such as duration, specification, and cost are vague and inaccurate. Risks analysis and risks evaluation is in overall process of risks assessment. For example, we need to investigate and forecast or do evaluation to a conservation refurbishment project at inception stage in order to lower the risks of a project. Hence, the practitioner should identify the risks in construction industry at inception stage especially for conservation projects in Malaysia.

The conservation refurbishment projects normally are containing technical and economic uncertainties and risks more than a new building projects. This is also the most problem constraint the conservation refurbishment projects in the construction industry. According to the Mansfield and Reyers (2000), the nature of conservation refurbishment projects is much more depend on the experts and specialist consultant and type of contractor. If the more knowledgeable of the expertise and specialist or contractor in conservation refurbishment project, subsequently lower the risks in the refurbishment period. According to Mansfield and Reyers (2000), the point of view of the risks in conservation refurbishment projects is come from many aspects as described follow:

- No guarantee of organization with suitable experience and expertise in each conservation refurbishment projects
- Minimum statutory requirement that affect the quality of specification
- Incomplete design information solve by using many assumption
- Missing and lacks of related document such as drawing and specification.
- Limited availability due to the using original and authentically materials and components
- Prohibitive cost for using original and authentically materials and components
- The design team too much reliance and depend on the specialist or craftsmanship

In Malaysia, the practitioners should not deny that the professional's skill of conservation still not very proper in such ways to preserve our historical building. Conservation projects should have its minimum quality in order to maintain historical building properties. Most of the practitioner are applied risks in construction but there is still lack of practitioner applied and do research risks in conservation projects. Therefore, the risks in conservation projects are usually high and as a barrier for practitioners.

FACTORS INFLUENCING THE GROWTH OF REFURBISHMENT SECTOR

Refurbishment works become an alternative when a building has reach to the end of its life cycle costing or service life, or fails to perform well as required in its use. For example, the building still can be used but it loss the value of function to operate. However, refurbishment works usually influenced or affected by a building's physical deterioration, and obsolescence such as economic change, change in use, investment decisions, historical value and change in condition (Aikivuori, 1996).

According to the research, many buildings in Malaysia are under or wrongly used by the people (Hamilton, 2003). This would induce the building to become dilapidated and damaged. The lack of maintenance such as stadium coupled with social problems, which can lead to vandalism and abuse increase the rate of wear and tear of buildings. The building owners could have the option to move out from the premise and build a new one on a different location, rebuild the building on the same site or refurbish the existing building. However, which option is taken is influenced by the following factors.

The first factors is economic recession, may force the building owners to conserve their building (Ali 2009). Financial crisis during the recession forces the government to cut expenditure on new construction, which reduces the total output quantities of new work during that period. This encourages building owners to give priority to improve their existing building rather than undertake new developments. In addition, limited land for development in strategic areas coupled with high land prices makes new construction expensive. As a result, many building owners realize that refurbishment is the best option among the all. However, Aikivuori (1996) have emphasized that the major reasons for refurbishment are not due to the economic cycle, but rather are due to obsolescence and deterioration.

Obsolescence is the process of an asset going out of use, which indicates the tendency for the objects and operations to become out-of-date or old-fashioned (Douglas, 2004). For example, in the situation that old buildings were completed in the year of 1960s, generally do not have extra space for additional new communication systems. Technological change makes the existing building system become obsolete faster. The needs for the building to accommodate the latest automation and electronic systems require the building owners to refurbish their buildings. The complexity of modern building automation systems requires sensitive design, particularly on their services layout. This is important for business organizations to provide better building equipment, quality workspace for their staff and a high standard of building appearance to enhance the building's position in the city (Watkins, 1996).

Refurbishment is an option to meet the change of demand of a building necessitated by the installation of modern facilities. Furthermore, information technology has changed the demand of new premises and the working environment of many people (Kincaid, 2003). Hence, working from a premise has become more common. Thus, the complete IT facilities with later technology installed in the premises to accommodate the function required create a greater demand for refurbishment. Even though these factors contribute to the growth of refurbishment projects, the performance of the projects is mostly unsatisfactory. Refurbishment projects are generally more uncertain than other construction projects (Reyers and Mansfield, 2001b). Refurbishment projects are mostly completed with high cost and time variances (Ali, 2009). Some of the main factors contributing to this problem are late discovery of design information, different in project size, different type of procurement method used, and inconsistence client's brief

throughout the projects period (Rahmat, 1997). However, research on performance of refurbishment projects in Malaysia is still new and inconclusive.

In conclusion, from point of view from different author, there are many factor that influencing the growth of refurbishment such as in economic perspective, government perspective, obsolescence of the building, new IT to improve communication services, and others. Hence, risks in refurbishment should be investigated and well planned in order to achieve optimum quality of work.

TYPES OF RISKS IN REFURBISHMENT PROJECTS

According to Reyers and Mansfield (2001b), five main points of risks associated with refurbishment projects which are cost risks, information risks, client briefing risks, external risks and other internal parties' risks. The following table show further details on these five main points.

Risks cluster	Risks Description
Capital and cost risks	• Reliabilities of cost data, cost and quality procedures investigated by client, cash flow decisions, changes to funding structure, invalid estimate • Risks in capital investment, influenced by physical deterioration of the building • Risks from various accounting regimes, influencing the extent and timing of work
Design information risks	• Difficulties in providing detailed, concise and inclusive definitions of the processes which may lead to a decline in value • Inadequate completion time, incomplete site survey information, clarity of specification of workmanship clauses, efficiency of contractual arrangement, consistency and completeness of design information
Client briefing risks	• Risks of inaccurately identifying boundaries between the processes In the physical cycle of refurbishment, example replacement, repair, and renewal • Vague brief, inflexibility requirement, over or under involvement in projects, limited awareness of constraints and inflexible to contractors and suppliers • Risks of loss of architectural or historical significance of the original fabric resulting from negligence • Risks of misunderstanding of liability such as under-insurance and failure to undertake risk management procedure
External risks	• Bureaucratic and slow approval procedures, statutory constraints and procedures, infrastructure charges, planning condition, interest rate
Other internal parties risks	• Continued occupancy during work, involvement of other consultants, reliable consultants, suitability of experience labour • Risks from the impact of liability of the designers and contractors such as bankruptcy due to award of damages • Risks in the team itself such as client-imposed specialists and those outside the establish team

Table 1: Risks clusters and descriptions of the risks
[Source: Reyers & Mansfield (2001b); Mansfield (2002)]

RISK IDENTIFICATION AND ANALYSIS

According to Williams (1995), risk identifications an essential first step in risk management and is possibly the most difficult stage. The identification of each source of risk and the components allows the risk item to be separated from others. Thus, it is more clearly seen by the client, contractor or consultant any risk involve when decision making. Considerations of each influence factor of risk in construction industry will simply the

analysis and management of the risk (Bajaj 1997). In risk identification, according to Godfrey (1996), the key question to ask is "what are the discrete features of the project (risk sources) which might cause such failure?" For example, risk in delaying completion time of project due to weather disruption which cannot be foreseen by any parties. There are two types of risk factors which shown in the table below:

Controllable risk factors	Uncontrollable risk factors
- Inadequate planning - Poor definition of scope and objectives - Errors in cost and time estimates - Poor quality control - Poor leadership - Lack of management support - Ineffective communication	- Weather - Material shortage - Price/currency fluctuations - Skill labour shortage - Technology changes - Natural disasters - Fire - Strikes - war

Table 2: The controllable risk factors and uncontrollable risk factors in construction industry

After the risk identified, the risk must be assessed for probability of existing on the construction project, and possible effects from occurrence and analysed. Risk assessment is the evaluation of the relative important of an estimated risk with respect to others risk. From the journal "A Systematic Approach to Risk management for Construction" written by Mills (2001), a simple formula to calculate the impact of risk can be measured as the likelihood of specific unwanted event and its unwanted consequences or loss in construction projects as following:

$RI = L \times C$
Where:
RI   = Risk Impact
L   = Likelihood
C   = Consequences

From the formula, likelihood is the how high probability of that event can happen and consequences is the how dangerous or impact for that event to occurred. Hence, if the probability of the event is higher, represent risk impact also will increase. Hence, we can conclude that both factors are proportional to each other's. Same goes to the consequences factor to risk impact.

Risk sometimes may be beneficial to the client. The outcome can always be unexpected, as costs may be less than anticipated at early stage, the weather may be kind at the end of year which expected is bad weather. Those risks are unforeseen and unexpected in construction industry. Hence, construction manager's role to identify and estimate the risk on behalf client is never end and should derive income or profit from the project.

RESEARCH METHODOLOGY

The selection of appropriate research methodology was very important in order to facilitate the data collection, data analysis and presentation to the reader. According to Naoum (2007), a research strategy is divided into two categories which are quantitative research and qualitative research. The quantitative research strategy was 'objective' in

nature. It was defined as an inquiry into a social or human problem, based on testing a hypothesis or a theory composed of variables, measured with numbers, and analysed with statistical procedures, in order to determine whether the hypothesis or the theory hold true. (Creswell, 2003). Whereas, the qualitative research was used in exploratory research, attitudinal research, and placement of theory which is less clear than quantitative design in term of rules and terminology. In the dissertation, both qualitative and quantitative are used in order to collect and analysis data for the title related to risks in conservation.

A large portion of the questionnaire uses the rating scale. The rating scale is commonly used to measure the attitude or perception of the respondents. In the questionnaire survey, the point Likert scale ranging from 'Never take note of it' to 'Take note to all process' or 'Strongly disagree' to 'Strongly agree' or 'Never heard of it' to 'Practice risk management' are used to analyses the respondents opinion . Table 3 shows the example of Likert scale used in the questionnaire survey. The questionnaire was designed into 4 important sections which are section A- General Information, section B- Past Conservation Project Experience, Section C- Risks in Conservation Refurbishment Project and final was Section D- Risk Management.

1	2	3	4	5
Strongly agree	agree	Neutral	disagree	Strongly disagree

Table 3: Example of Likert Scale used for questionnaire

ANALYSIS AND FINDINGS

There were only 5.9% director of the company take this survey and the most was quantity surveyor which contains 82.3% and followed by project manager which was 11.8%. The largest percentage of job position in the survey was quantity surveyor which occupied 82.3% as shown in the table 3.

Table 4: Job position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Director	2	5.9	5.9	5.9
	Project Manager	4	11.8	11.8	17.6
	Quantity Surveyor	28	82.4	82.4	100.0
	Total	34	100.0	100.0	

Table 5: Education qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	7	20.6	20.6	20.6
	Degree	23	67.6	67.6	88.2
	Master	1	2.9	2.9	91.2
	Ph.D.	1	2.9	2.9	94.1
	Others	2	5.9	5.9	100.0
	Total	34	100.0	100.0	

There were 20 barriers that the researcher had been choose into the questionnaire in order to determine which factors were the most important barriers and problems into the least important barriers that answer by the respondents in the conservation refurbishment projects. The mode, mean and standard deviation had been identified.

The findings can concluded the most five barriers of important level that influence in conservation refurbishment projects were reliable historic cost information available; followed by approval procedures too bureaucratic and slow; inaccuracy or incomplete site or survey information; continued occupancy during work; and availability of materials as shown in the table 6.

Table 6: The 5 most important level barriers answer by the respondents extracted among the 20 barriers.

No.	Barriers	Mode	Mean	Standard deviation	1-std. deviation
1	Reliable historic cost information available	3	2.41	.957	0.043
2	Approval procedures too bureaucratic and slow	2	2.41	.925	0.075
3	Inaccuracy or incomplete site or survey information	2	2.50	1.080	-0.080
4	Continued occupancy during work	3	2.50	.826	0.174
5	Availability of materials	2	2.56	.991	0.009

First Objectives- To Identify The Type Of Risk In Conservation Refurbishment Projects

Figure 1: Type of risk in conservation refurbishment projects

Time risk can be classified as extension of time in the conservation refurbishment project. The risk extension of time in the conservation projects is higher than new-built projects **(Mansfield, 2001)**. Cost risk is also an important risk in conservation refurbishment projects. Normally, projects in conservation refurbishment projects are more risky than new-built projects due to unavailable of identical material in the local. Hence, need to import material from foreign country then increased the cost. Lastly, safety risk very important in conservation refurbishment project even in new-built project as well. From the analysis and findings, the building is occupied by the user when working carried out in same time. Hence, safety risk not only includes worker but also public user as well. So, a more proper planning shall be implemented in order to reduce the safety risk in conservation refurbishment projects.

Second Objective- To Identify The Problems And Barriers Of Conservation Refurbishment Projects

First of all, the level of the important barriers in the refurbishment work is identified in the questionnaire as shown in the chapter 5 and 6- analysis and findings. The first five levels

important of barrier in conservation refurbishment work is identify in the questionnaire. The type of barriers and problem arise in the conservation refurbishment work were identified by cross tabulation between questionnaire survey and interviews section. Hence, a more reinforced result was being established by these 2 methods of research.

Table 7: Analysis the barriers achieve in questionnaire and interview

Questionnaire	Interview
Reliable historic cost information available	√ (Respondent A, Respondent B)
Approval procedures too bureaucratic and slow	√ (Respondent B)
Inaccuracy or incomplete site or survey information	√ (Respondent A, Respondent B)
Continued occupancy during work	√ (Respondent A)
Availability of materials	√ (Respondent A, Respondent B, Respondent C)

From the table 7, it can be proved that the practitioners from the construction industry agree with the point of barriers in the conservation refurbishment work such as reliable historical cost information available; approval procedures too bureaucratic and slow; inaccuracy or incomplete site or survey information; and continued occupancy during work and availability of materials.

Third Objective- To Determine Solution To Reduce The Risk In Conservation Refurbishment Projects

From the reading through literature review, questionnaires survey and interview with the practitioners, several methods can be implemented in order to reduce the risk in conservation projects:

- Establish standard form of contract related to conservation work
- Government has to train the particular contractor or consultants in conservation refurbishment works and subsidy special tools for future construction in order to reduce overall cost.
- Do dilapidation report before commencing of works
- Frequently meeting among the parties may reduce communication problem.

CONCLUSION AND RECOMMENDATIONS

Firstly, in the conservation refurbishment field, the recommendations that can be given are there is still unavailable of standard form of contract to describe the description of conservation work. Hence, there is still a lot of vague in some part of the element of work such as in term of costing, responsibilities each of the parties, specification of work and others important problem that cannot be solve without standard form of contract. In addition, the risk of conservation work could be reducing when there has standard form of contract as guidance to the practitioners in the construction industry. Besides that, the cost data and information will be available with the standard form of contract. So, the local authority such as Jabatan Warisan Negara is advisable to implement these methods as soon as possible if it is feasible. In directly, there will be more involvement of the practitioners in the conservation field. Hence, more of the historical building in the Malaysia can be preserved and conserved and the identical of the country can be preserved as well. For example, only a few states in Malaysia more effectively to carry out conservation work such as Melaka and Pulau Pinang. The others states in Malaysia is not very well practiced and applied.

Secondly, applying of the risk management in the construction industry is not well practice in Malaysia. This can be proved in the questionnaire analysis, only 8.8% of the practitioners applying risk management in the project. This result that construction industry still poor in coping with risk in the project. Risk management can help to reduce the contingency cost in the projects as well. Hence, it is good when there is risk management processes applied in each stage of the conservation refurbishment projects.

From the research analysis, there is still lack of skilled worker and construction technology in the conservation refurbishment work. A good recommendation from the interviewers, the government has to train the particular contractor via skilled worker and subsidy the special tools for the future construction in order to reduce the overall cost. Government is the main drivers to implement a better work in the conservation work since majority of the conservation work involving government's building properties.

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