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All papers submitted to COBRA were subjected to a double-blind (peer review) refereeing process. Referees were drawn from an expert panel, representing respected academics from the construction and building research community. The conference organisers wish to extend their appreciation to the following members of the panel for their work, which is invaluable to the success of COBRA.

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Uncertainty of Building Regulation for Refurbishment Projects in Malaysia

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Abstract:

The uncertainty of refurbishment projects is reflected in the difficulty in getting accurate design information during the design process. One of the factors contributing to the uncertainty in refurbishment projects is building legislation. The changing and updating some of the building regulations by government has also affected the approval process in refurbishment projects, especially projects related to conservation. The statutory requirements could cause project delays and cost overruns due to adjustments that need to be made to design in order to comply with the regulations. Therefore, the main objectives of this paper are to present the difficulties that contributed to the uncertainty of building legislation and to show how it affects the overall performance of refurbishment projects. Quantitative research techniques are used, which consists of review of literature and a postal questionnaire survey that involved 234 respondents. From 234 questionnaires sent out, 62 questionnaires were found to be suitable to form a database for analysis. Descriptive and inferential statistics are used in the data analysis. The results conclude that complexity in refurbishment projects in Malaysia is made worse by uncertainty of building legislation. The associative test indicates that performance of refurbishment projects suffered from the uncertainty of building regulations.

Keywords:

Uncertainty, Building-Regulation, Refurbishment, Malaysia.

1 Introduction

Refurbishment work includes upgrading, alteration, extension and renovation to existing buildings to improve facilities and building lifespan. This work does not include routine maintenance works such as daily cleaning works, daily building inspection and monitoring (Ali and Rahmat, 2009; Ali, 2009). In Malaysia, there are several reasons why refurbishment has become a popular sector. The increased number of age buildings and rapidly changing technology in Malaysia construction demands building to be altered to accommodate with current building used (Ali et al., 2009). Table 1 shows the increase number in refurbishment projects in Malaysia since 2007.

Table 1: Total Refurbishment Projects 2007- 2009

Source: Malaysia, CIDB (2009)

Types of Refurbishment Works	Number of Projects		
	2007	2008	2009
Upgrading	448	548	608
Expansion	351	282	471
Repair	268	249	257
Renovation	263	287	215
TOTAL	1330	1336	1551

Although refurbishment work is an important activity in Malaysia, it is not easy to manage. Ali et al. (2008) highlighted that refurbishment characteristics are complex compared to newly built construction which involved various aspects such as technical, technology, legislative, ecological, social and comfort. This requires proper planning in order to complete the project on time and to meet the client's requirements (Rahmat and Ali, 2010).

In addition, in building regulation, refurbishment design is one of sectors that are affected by the complexities of legislation. Changing and updating building regulations by government have also affected approval process in refurbishment projects, especially projects related to conservation. Highfield (2000) pointed out that some of refurbishment schemes need to comply with current building regulations. Refurbishments for heritage buildings have to face regulations that are more stringent and must comply with the listed building requirements, which limits the extent of alteration work allowed. The statutory requirements could cause project delays and cost overruns due to adjustments that need to be made to design in order to comply with the regulations. Hence, this paper will review the effect of building regulations towards the performance of refurbishment projects in Malaysia.

2 Uncertainty of Statutory Requirements

Design in construction projects needs approval from the appropriate authorities before it can be implemented. Holm (2000) pointed out that construction is one of the sector affected by the complexities of legislation requirements. In refurbishment projects, there

is also a need to comply with statutory requirements (Highfield, 2000). However, only certain types of refurbishment projects, which involve change of use, alteration of facade and historical building are subject more broadly to statutory requirements (CIRIA, 1994). In addition, the requirements for refurbishment of listed building are more stringent and need to be handled with sensitivity by the designers. Fire, thermal and acoustic requirements also usually affect the refurbishment schemes.

Time taken by authorities especially for the issuance of design approval is uncertain and difficult to predict. This could affect the schedule and progress of refurbishment projects. Kincaid (2003) pointed out that the majority of design participants such as architects, engineers, contractors and developers generally agree that planning, building regulation, fire and site approval are the largest obstacle to the progress of refurbishment projects. Similarly, a case study carried out by Mitropoulos and Howell (2002) also found that the main reason for to delay in refurbishment projects was the process of getting approval from the local authority. When delay in refurbishment projects occurred, the overall cost for the project would also be affected. McKim et al. (2000) mentioned that one of the factors contributing to cost and schedule overruns is the regulatory requirements. In some cases, the drawings had to be submitted more than once due to amendment that needed to be incorporated. This is sometimes due to the uncertainty of requirements set by the respective authorities. Manavazhi and Xunzhi (2001) stated that one of the reasons that lead to reworking in design is changes in statutory regulation.

The Malaysia Town and Country Planning act, Act 172 (1976) clause 19 under the planning and control section states that for refurbishment work that does not involve change of usage, change of building facade, addition to building height or area and anything that does not conflict with the local plan it is not necessary to obtain approval from the Town Planning Department of the local council. The clause indicates that not all refurbishment work is involved with planning requirement. Only refurbishment projects that do not obtain fall under the abovementioned category would have to abide with the Act. However, the Uniform Building bye Laws (1984) extensively covered for building design work normally coupled with some other requirements set by the local authorities. Each local authority has its own special-requirements that need to be followed by the architects to get approval for a submitted plan. Architects are often unsure of the requirements set, especially when it is the first time they have been involved in the submission of a plan to the respective local authorities. Listed buildings are covered under different planning and building rules and regulations. The relatedness of an existing building to the new rules and regulations determine to what extent a building would allowed to be altered. In some circumstances, to comply with current regulations would require major alterations and would affect the viability of the project. In such situations, it might be wiser to carry out only a refurbishment and maintain the original appearance of the building.

To overcome uncertainty in statutory requirements, Ling (2002) suggested that appropriate attributes of designers are required. Designers who are knowledgeable and enthusiastic about their work could obtain statutory approval speedily. Knowledgeable designers would bring their knowledge in legislation and regulation to acceptable practice.

The review of literature has indicated that uncertainty of statutory requirements lengthens the time needed to obtain approval. Therefore, it requires knowledge and enthusiasm on the part of the designers to avoid any unnecessary delay for design approval.

3 Research Methodology

This paper takes both a quantitative and qualitative approach to research. Semi-structured interviews were implemented for qualitative part and postal questionnaire surveys were used for quantitative data collection. In order to get a high response rate, the questionnaires were short and simple and did not take much time for respondents to answer. The respondents in this study were designers and architects who are directly involved in getting approval from respective local authorities. A set of questionnaires were sent to the final list of 234 respondents. After filtering the responses, 62 questionnaires were found to be useful for analysis, giving a response rate of around 30 percent. The responses represent 62 different refurbishment projects that the minimum contract value is RM 500,000. The demographic profile of the respondents is shown in Figure 1. The profile shows more than two-thirds of the respondents were principal architects with more than 10 years working experience. This indicates that the data collected is reliable.

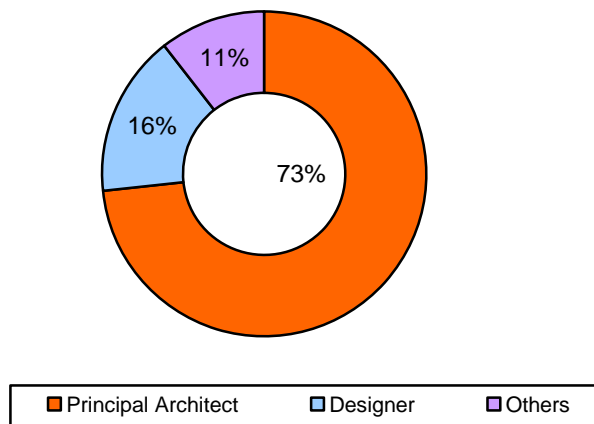


Figure 1: Job Title of the Respondents (n=62)

4 Result and Discussion

The result shown in Table 2 suggests that most of the refurbishment projects did not face much difficulty due to uncertainty of regulations set by the appropriate authorities.

Almost 70 percent of respondents agreed that requirements for refurbishment projects were certain. The architects did not have much problem dealing with the local authorities. Regulations for refurbishment conservation are more stringent. It is probable that the results show few problems regarding regulations because refurbishment projects in the present study did not consist of many conservation projects.

Table 2: The Degree of Certainty of Statutory Requirements

Statutory Requirement	Percentage (n=62)
Very uncertain	2.8
Uncertain	9.7
Neutral	20.8
Certain	25.0
Very certain	41.7
Total	100.0

However, in the semi-structured interviews, ten principal architects in Kuala Lumpur revealed that the majority of local authorities in the country had their special requirements for refurbishment in addition to the general requirements of building byelaws. The special requirements normally were not explicit like the standard byelaws. Normally, the architects had to liaise closely with the building department in the local authority regarding the additional requirements that needed to be fulfilled. As a result, the local councils rejected some of the drawings submitted for approval because they did not comply with the special requirements. It happened to ten architects who were not familiar with the particular local authority. The inconsistency of supplementary requirements of local authorities caused problems for the architects. Moreover, the time taken by the authority to give approval to the design was quite long, and that sometimes caused a delay in the commencement of a project. The interviews also revealed that refurbishment projects that did not involve changes of function, façade of the building, additional floor area or additional height of building were not complicated in fulfilling the requirements. The majority of refurbishment projects in the present study probably did not include these kinds of changes since few problems were faced by the architects. It is likely that the Malaysian Town and Country Planning Act, Act 172 (1976) and Uniform Building Bye Laws (1984) are not extensively applicable in refurbishment projects in this country except for the fire department requirements. Most architects only had to submit their design for fire department approval. The semi-structured interview also highlighted the fact that most of the statutory requirements were related with services information. It could be that the scope of work for most of the refurbishment works involved alteration for fire services system such as sprinkler pipes, smoke spill fan, fire detection system, HVAC and electrical system that needed approval from the fire department.

In some cases, the regulations might be relaxed and there could be an advantage in adapting a building so that it could be classified under current regulations. For instance, in a case of refurbishment projects of the *Takaful Nasional* office-building tower in Kuala Lumpur, it was better to leave it under existing regulations, as only minor refurbishments were required to be carried out. The work was not greatly affected by the current regulations because no alterations were made to the building's facade. However, in the conversion of shop-houses to a commercial shopping complex at *Plaza Warisan* Kuala Lumpur, it was found that regulations concerning car-parking requirements had to be changed. This worked in favour of increasing the overall number of users. A careful analysis of the plot ratio of the existing building to see if it could be maximized under current regulation could be financially rewarding.

4.1 The Effect of Statutory Requirements to Refurbishment Design Performance.

Table 3 shows that the Spearman's rank correlation coefficient detected a significant correlation between the statutory requirements variable and the changes of design variable. Statutory requirements include plan approval from the appropriate bodies, especially the relevant local authority. Problem is that special requirements for local authorities are not uniform, are inconsistent and are frequently changed. This prolongs the process of plan approval.

Table 3: The Correlation Matrix between Project Variables and Design Performance

Project variable	Changes of design during the construction stage	Provisional sum to contract value	Time variance	Cost variance
Statutory requirements	-.257*	-.150	-.030	-.094

* Correlation at 5% significance level

** Correlation at 1% significance level

The inconsistency of special requirements between different local authorities influences the amount of changes in refurbishment design. Manavazhi and Xunzhi (2001) discovered a similar problem: they found revisions in design were a result of inconsistency in statutory regulations.

The result implies the need for designers to have good relationships with personnel in the local authority in order to avoid breakdowns in communication, which can prevent the required information flow. Statutory requirements normally involve approval from the local authority. This needs initiative on the part of the architects to coordinate with the authority's personnel to find out any special requirements that need to be fulfilled. More initiative is needed from the designers to ascertain any new requirements implemented by the relevant authorities. The processing of plans for approval could be expedited if all the authorities' requirements were fulfilled at the outset.

Semi-structured interviews show that handling statutory requirements is not an easy task. It needs positive architects' attributes to manage the situation since statutory requirements mostly involve dealing with approval from government agencies. Approval of the submitted plan depends on information obtained from the other key participants. Requirements such as structural and sewerage system are the province of the C&S engineer; fire requirements, power supply and HVAC are the province of the M&E engineer etc. As a result, architects need more meetings and contacts for architects to collect information required for plan approval. Inability of the architects to coordinate with other designers could affect the progress of the refurbishment project by delaying design approval, as mentioned by Kincaid (2003), Mitropoulos and Howell (2002). Second, the result implies that it is important to maintain a good relationship with the authority's personnel. It is easier for architects to check the status of a submitted plan, to get information on any amendment or special requirements and frequently they are able to expedite the plan approval process.

5 Conclusion

In conclusion, the results show that uncertainty of building regulations for refurbishment projects influence the design performance. This indicates that the performance of refurbishment projects suffered from uncertainty depending upon the nature of projects. However, the semi-structured interviews show that the problem could be minimized by having good relationship between designer and authority personnel, in addition to positive initiatives from the designer's.

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