PROJECT ANALYSIS ON TWO LOW COST HOUSING SCHEMES IN SARAWAK
(MODULAR METHOD VS CONVENTIONAL METHOD)

by

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To my beloved parents
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First and foremost the author would like to thank Allah s.w.t for the entire blessing of my whole life. It is really a great pleasure after working on this thesis completely. No more tears, stress or tension and now those feelings could only be expressed by a sweet smile. Alhamdulillah.

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ABSTRAK

ABSTRACT

Construction project presents difficulties and problems especially in the low cost housing industry. The low cost housing scheme is an alternative done by the government to assure that the low-income group could own their own houses. Unfortunately, the provision of the low cost housing projects encounters a lot of problems particularly in producing a quality house within a specific range of price. These problems mainly have a correlation with one of the important key words in developing a project, which is the project management system and subsequently have generated interests among researchers to solve it. In Sarawak, there are two approaches of construction methods in developing the low cost housing projects. One is the conventional method, which has traditionally applied to every project and another is modular method, which is recently being implemented to the low cost housing scheme in Sarawak. This research paper evaluates the project management system of two low cost housing schemes in Sarawak, using different construction method as mentioned above. The analysis is done in such a way to examine the effectiveness of the conventional method and the modular method of construction in terms of their project management systems and the engineering aspects involved. The process of the project implemented by each construction method is presented clearly by figures and diagrams to show the absolute sequential of the construction process. Consequently, this research will come out with the future low cost housing scheme using either modular or conventional method, which has more prospects to be developed here in Sarawak.
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CHAPTER 1

INTRODUCTION

This chapter concerns the introduction of the low cost housing industry in Malaysia, particularly in Sarawak. The starting point is to define the meaning of the project analysis, which is one of the most widely discussed topics in the remainder chapter of this research. Consideration will then be given to introduction of the low cost housing schemes in Malaysia focus on the demand and specification required. It is a common in any research to identify the objectives, scope of study and the methodology in presenting the research. The particular objectives of this research are to discuss the low cost housing schemes in Sarawak considering the different method of construction, which acquire different project management system.

Accordingly, we focus on the principles of presenting low cost housing analysis in this chapter and later the remainder chapter will expand on some of these principles.

1.1 Introduction to construction projects

Construction projects are intricate and time-consuming undertakings. The development of a project normally involves skills, materials and literally hundreds of different operations. Therefore, the construction project management plays an
important role in developing a construction project. Project management is defined as management planning, directing, controlling, co-ordinating and implementing a specific construction project based on the particular needs, requirements and objectives of the owner within the specified time period, budget and the required quality standard. The objective of conducting management for a project is to treat project planning, design and construction as integrated task within a construction system. A single definition of project management is not easy but a statement from Lock (1992) gives a good idea of specific problems, while retaining the importance of the processes of management previously considered:

The function of project management is to foresee or predict as many of the dangers and problems as possible and to plan, organize and control activities so that the project is completed successfully in spite of the risk.

In this paper, the term 'project analysis' relates to the analysis of construction project management from the project inception to project completion. The analysis is applied to the different method of construction for the low cost housing schemes with the objective of achieving a better future low cost housing scheme in Sarawak.

1.2 Low Cost Housing

Housing has always been recognized as a basic social needs and center for a good family development. The rapid expansion of the population increases the development of housing industry in Malaysia and therefore the industry accords its priority as a contributor towards national Gross Development Product (GDP). In order to achieve a high level of housing production, the government has to ensure that every family in Malaysia could own its own house including the low-income group. As a
result, the government has put an effort in providing the low cost housing schemes to this group.

The low cost housing schemes, introduced by the second Prime Minister of Malaysia, Tun Abdul Razak is an effort to give the opportunity for the low-income group to own the low cost houses. Furthermore, under the new economic growth in 1971 the provision of low cost housing has been focused to ensure that the low cost houses are appropriately located and planned. The aspects of strategic location and infrastructure have become the major element in producing low cost housing.

Currently, under the 7th Malaysian Plan the government has implemented two major policies that need to be done. The first policy is to speed up the low cost housing and the second is to encourage the participation of private sectors in the low cost housing industry.

There is a high demand for low cost housing in this country. According to a recent housing statistics, the population growth by years increased the number of houses in Malaysia. In 1970, the population growth is 10.4 million with 26.8% is the urban population. The houses were built to 1,970,000 units. In 1991, the houses increase to 4,093,000 units as the increasing of the population to 17.6 million people. It is expected that the number of houses in Malaysia will increase to 9,500,000 units in the year 2000 (Source: Dr. Muhammad b. Norg and R. Ramachandran, 1998)

To fulfill the needs, the mass production of low cost housing schemes has to be done. In some cases, the mass production has affected the provision of the low cost
houses. It can be noted that some of the low cost housing schemes is constructed regardless of the specification required.

1.3 Specification of Low Cost Housing

In most housing projects, the government has provided subsidy for the low cost housing. Since the current economic turmoil, the sales of houses decrease and automatically reduce the subsidy of the low cost housing. However, the ministry of housing is trying to give the best for the low-income group by setting up guidelines for the low cost houses on the price of RM 25,000 per units at present time. Therefore most of the low cost housing is built with minimum requirements as to meet the target cost of the buildings. The structural design of the low cost housing should follow the guidelines required for safety and good engineering practices.

Historically, the low cost housing in Malaysia consist of not more than double-storey units of houses from different categories such as terrace, semi-detached, cluster and single units but nowadays, flats are also considered as low cost houses. The area provided for the houses is between 550-600 feet square with at least three bedrooms, a living and dining hall, a kitchen, bathroom and toilet. The specification of the dimensions should be according to MS 1064 – Guide To Modular Coordination in Building. The build up area of the houses is given in Table 1. The floor net area should not less than 60.00m² excluded the area of verandah. The bathroom and the toilet should be separated.
<table>
<thead>
<tr>
<th>Description</th>
<th>Area, m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom 1</td>
<td>11.70</td>
</tr>
<tr>
<td>Bedroom 2</td>
<td>9.90</td>
</tr>
<tr>
<td>Bedroom 3</td>
<td>7.20</td>
</tr>
<tr>
<td>Kitchen</td>
<td>5.40</td>
</tr>
<tr>
<td>Bathroom</td>
<td>1.80</td>
</tr>
<tr>
<td>Toilet</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Table 1: Built up area of the low cost house

This research is done to examine the way of analyzing management function in terms of maximizing revenue and minimizing costs within the appropriate duration. The project management processes particularly determine the success of the construction process of the project. Therefore, consideration must be given to the project management of the projects focusing on time and cost.

1.4 Aim and Objectives

The research is based on the analysis of two low cost housing schemes in terms of their effectiveness in construction management and in method of construction. The objectives of the research is:

- to discuss the management of two different low cost housing schemes during their accomplishment in the field.
• to discuss two different methods of construction for the low cost housing schemes which are the conventional method and the modular method of housing.
• to describe the engineering aspects for both methods in terms of the advantages and disadvantages.
• to suggest the most desirable future low cost housing in Sarawak based on both management and engineering aspects.

1.5 Scope of study

The research is carried out to analyze the two low cost housing schemes, which differ from each other in terms of method of construction. The two low cost housing schemes are between conventional and modular housing. A critical evaluation was carried out on the project to examine the typical project management. Cost and time are the major aspects account for the new effective project management. In order to ascertain the suitability of the housing schemes, the new materials and technology need to be considered which can result in better quality, faster speed and more cost effective construction.

It is aimed in this project that the construction project management for both method of construction to be analyze and discussed. If a project is to be constructed within its established budget and time schedule, close management control of field operation is a necessity. Project condition such as technical complexity, importance of timely completion, resource limitations, and substantial costs put great emphasis on the planning scheduling and controlling of the construction operations. As a result of
the analysis, the research will come up with the future low cost housing scheme in Sarawak, which leads to better quality and faster speed of construction.

1.6 Methodology

The data was collected from the government sector, contractor, developer and consultant of the low cost housing projects. Interviews were carried out to gather all the data for necessary comparison. To analyze both projects, the detail information on the construction progress and completion was obtained. The data needed for this project are consisted of drawings, specifications, progress report and bill of quantity. The parties involve in the research were the Suruhanjaya Pembangunan dan Perumahan Sarawak for the conventional housing and Cahya Mata Sarawak Sendirian Berhad for modular housing. Both of the parties were responsible in the provision of the low cost housing project in Kuching, Sarawak. As an addition, some of the information was also taken based on the present research and reference books.

1.7 Literature Review

1. A research study undertaken by British Research Establishment in United Kingdom shows that failure in construction sector is caused by:

   • Poor workmanship
   • Improper design
   • Improper specification
   • Material failure
2. A study done by some researchers in the Asia Pacific (Building Materials For Low Income Housing) proposed techniques for the construction of materials for rural low cost building in order to reduce costs and considerable economy. The research was based on the problems occurred in the construction process.

3. Study by the Business Roundtable (1992) of U.S, which has conduct Construction Industry Cost Effectiveness (CICE) found that the U.S construction industry faced a number of problems to remain competitive in the construction market. The CICE study has shown that most on-site delays and inefficiencies lie within the control of management.

4. Research by Dr. Bernard T H Wang (Construction and Development, 1987) shows that the efficiency and effectiveness of construction industry in any country (with reference to Malaysia) has influenced by major factors such as:
   - Financial, labor material and equipment
   - Technical and managerial personnel
   - Contractors' organization and capability
   - Use of new technologies
   - Team-work in construction
   - Laws, regulation and other government control
   - Education and training in construction
   - Practices and traditions of the industry
   - Prevailing social, political and economic conditions
5. Modular Housing website (www.modular.com) stated that this method of construction produce more advantages in terms of the engineering aspects.

6. Research done by Cahya Mata Sarawak Sdn. Bhd. shown that the Australia Modular Method of Housing should be applied to the low cost housing schemes in Sarawak because of its speed of construction and cost effective.

1.8 Conclusion

Since all actions have their reactions and the actions and reactions will in turn interact with one another, thus this present research of project analysis on low cost housing schemes is done to evaluate the flow of project management of focused projects in terms of time and cost effectiveness. It is also applied to present the solutions to overcome the problems encountered in construction field.
CHAPTER 2

BACKGROUND OF STUDY

This chapter is focussed on the low cost housing project in Sarawak in terms of demand, budget and the construction process available. The first section of the chapter introduces the specification required for the low cost housing schemes in Sarawak and the remainder of this chapter looks into more detail on the project management system for a construction process.

The project management of a construction project was determined and described to analyse the construction process conducted on the low cost housing schemes in Sarawak. The needs for housing have increased the demand of low cost housing. Thus, the mass production of the houses should be handled in a short duration. To be effective, the project management analysis examines how the duration and costs of a project relates. Furthermore, the function of project management in a construction project has been focussed in terms of planning and estimating with the objective of establishing a good management system.

2.1 Low Cost Housing in Sarawak

Based on the study carried out by Sarawak Housing and Development Commission (HDC), the demand for low cost housing in Sarawak would be about
84,000 units up to the year 2000. The provision of the low cost housing schemes increases as the number of applicants increases yearly.

The Ministry of Housing and Local Government has set a standard figure of RM32,000 per unit as the maximum price per unit for all residential development termed as low cost housing in Sarawak. At the present, only Sarawak Housing and Development Commission is building the low cost houses. The housing schemes are known as Rumah Rakyat Housing. The targeted group of population who are entitled to this type of housing scheme are the low income group as those whose gross household incomes is below RM 800 per month.

Before examining the Rumah Rakyat housing standards in detail, it is necessary to first consider the principles for formulation of such standards. The economic aspects need to be considered in formulating planning standards where it dictates design and layout. This is in line with the objectives of low cost housing construction whereby they should be in conformity with the affordability of the lower income groups as well as encourage them to own their own houses.

The specification of Rumah Rakyat housing required by Sarawak Housing and Development Commission stated that the house should be built with two bedrooms, living and dining hall, kitchen, bathroom and toilet. The total area of the house is 40.25 meter square. The built up floor area of low cost houses in Sarawak is shown in Table 2.
### Table 2: Built up area for low cost housing in Sarawak

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living, Dining and Kitchen</td>
<td>20.625</td>
</tr>
<tr>
<td>Bedroom 1</td>
<td>9.075</td>
</tr>
<tr>
<td>Bedroom 2</td>
<td>8.800</td>
</tr>
<tr>
<td>Bathroom and Toilet</td>
<td>1.750</td>
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</table>

2.2 Project management of low cost housing

The project management for the low cost housing schemes is similar as other construction project management systems. It is important to have a reliable project management for the low cost housing projects because the schemes need to be constructed within its budget and limited duration. Furthermore, the subsidy for the low cost housing schemes is limited and only proposed for the low-income group. Thus, the project need to be planned and controlled during its progress to make sure that it will be completed in a specific duration.

The management and control of project time, cost, resources and finance relates to the activities done in the project management system. It requires an integrated task of variable phases as planning, organising, directing and controlling the construction project. Project management especially in terms of planning, scheduling and costing is a critical element in construction activities. On the other hand, it is a function of executive leadership and provides the cohesive force that binds together the several diverse elements into a team effort of project completion. Therefore, the project
management system is taking part in every construction projects including the low cost housing schemes. The project management is largely accomplished through personnel of different parties, working together, changing from one job to the next. This involves the manpower, construction equipment, materials, suppliers and supervision necessary to accomplish the work until it is completed. It is also directed toward pulling together all the diverse elements necessary to complete the project satisfactorily.

For the low cost housing schemes, the current technology is still low-tech, time consuming and labour intensive. The Sarawak Housing and Development Commission (HDC) is still applying the conventional method to the low cost housing projects. In the mean time, the Cahaya Mata Sarawak Sdn. Bhd. has put an effort in introducing a new method of construction for low cost housing schemes, which is modular housing method. The conventional method requires the existence of various and large quantity of materials present at site. On the other hand, the modular housing method serves perfect models but the materials used are off cost-effective. The project management system plays critical role in constructing the construction progress in whatever condition, either it is using conventional or modular housing method. Thus, the project must be completed within the time and cost limitation in order to serve the best interests of the owner by manipulating the project management system.

2.2.1 Project Planning

Planning is devising a workable scheme of operations that accomplish an established objective when put into action. It requires an intimate knowledge of construction methods combined with the ability to visualise work elements and to