

## CONSTRUCTION METHODS COMMONLY USED FOR AFFORDABLE HOUSING IN MALAYSIA

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**ABSTRACT** Despite the Malaysian government recent urge to provide adequate housing for different income group, there is no significant research on constructing technologies used in affordable housing. Furthermore, the quality of the affordable housing provided does not satisfy the user's expectation [1]. Hence, this paper aims to examine the various construction technologies used in affordable housing in Malaysia. Affordable housing is further divided to low-income housing and housing targeted for middle-income groups. A quantitative approach was taken and a questionnaire was distributed to developers and contractors and overall 36 response was collected. The findings reveal that different contractors and developers decide the construction methods based on their experience and preference and the client's requirements. However, based on the respondents experience Flat's are the most appropriate type of housing for low-income group, whereas for middle-income group terrace houses are considered suitable. As for the construction method used; regardless of the type of housing, Concrete is commonly used for building frame and precast concrete is widely used for the external walls.

**Keywords:** Affordable Housing, Low Income Housing, Construction Technology, Construction Materials.

### 1. INTRODUCTION

Affordable housing has been defined in relation to the families income; a housing which does not cost more than 30% of the family earning is considered affordable [2]. Therefore, many have used the term low-cost housing to specify the target group. The Malaysian government has divided the housing development into three categories, low, medium and high-cost housing [3]. Since the Malaysian population is very young; there are many new families with low income and medium income in demand for an affordable dwelling. Families with a monthly household income 2500 RM and below are classified under low income, while families with an income range of 2500RM-10000 are considered middle-income [4]. Thus, in this paper, we divided the affordable housing into two categories, low income and middle-income housing projects. Although 1.3 million low-cost housing have been built in the recent years and another 1 million units are going to be built by 2020 [5], limited research has been done to formulate strategies or policies for construction technologies which are suitable for these type of housing.

With the increasing demand for affordable housing and today's emphasis on sustainable development, it is crucial to identify an appropriate solution for sustainable affordable housing. At present, there are various construction technologies used across the world for affordable housing. Institute of Construction and Infrastructure Management in Switzerland conducted a worldwide research to identify and assess these technologies in 2011. The research revealed that there are many different types of technologies that could be considered from traditional methods of using timber and bamboo to the modern technologies such as Concrete and there are vast potentials for improving current methods and developing new methods through combining these techniques[6]. However, there is no research which identifies or assesses the technologies which are currently used for housing in Malaysia. Hence, this paper aims to take the first step in identifying the current practices in the construction industry.

## 2. RESEARCH METHODOLOGY

An in-depth literature review was conducted to identify the common construction methods adapted for residential buildings and a questionnaire was designed to determine which of these methods are being used in affordable housing. In addition; the second part of the questionnaire focuses on the criteria's that are considered during the selection of the finishing materials for these type of housing. Seventy questionnaire were distributed to developers and grade (1-3) contractors in Seremban, out of which 36 respond was received due to time constraints of the research.

## 3. FINDINGS AND DISCUSSION

In general; based on the respondent experience, the main difference between low-income housing and middle-income dwelling is the type of housing. Terrace house is usually considered suitable for middle-income group whereas, flat's are found more economical for low-cost housing projects. Also, the respondents believe that the major factor that difference between the two is the quality of the finishing materials used. Admittedly, lower quality materials are used for low-cost housing projects. Other factors such as construction methods are approximately the same.

Table 1, illustrates the construction method's commonly used in different type of affordable housing projects. Based on the finding there are no major differences between the construction methods used for different type of housing development. The majority asserts that the most commonly used type of building frame is concrete, as it is considered much more economical than steel or timber. Half of the respondent agree that precast concrete wall is a suitable choice for affordable housing while 25% believe that concrete blocks are more suitable. As for roofing technique, the respondents believe that the most common types are trusses and prefabricated steel.

**Table 1 Construction Methods commonly used for different type of affordable housing in malaysia**

Construction method	Semi-detached	apartment	flat	terrace
<b>Building Frame</b>				
Concrete	91%	80%	88.5%	88.5%
Steel frame	8.5%	17%	2%	5%
Timber frame	0%	5%	2%	5%
<b>External Wall</b>				
Precast concrete	50%	50%	50%	50%
Ceramic block	11%	11%	11%	11%
Concret block	25%	25%	25%	25%
Concrete	13.8%	13.8%	13.8%	13.8%
<b>Roofing</b>				
Timber roofing	11%	11%	11%	11%
trusses	30%	30%	30%	30%
Fabricated steel	19.4%	19.4%	19.4%	19.4%
Prefabricated steel	36%	36%	36%	36%

As for the criteria's used for selecting finishing materials for affordable housing, it is evident that developers and contracts commented that the most important criteria that they considered are the initial cost, followed by the durability of the material. However, they do agree that the aesthetic value and the maintenance cost of the material should be considered as well. They also asserted that the main difference between low-income housing and middle-income housing project is the quality of the finishing materials that they use.

#### 4. CONCLUSION

In conclusion, there are no common understanding or guidelines referred to by all the developers and contractors in regards to construction technologies used in affordable housing development. The stakeholders in the construction industry decide on the details of the projects case by case, based on their experience, preference, and the location. Hence, the most important criteria considered is the overall cost of the building. Thus, the quality, sustainability, and user's demand are not taking into account. Further research needs to be carried out to assess and evaluate the construction technologies used in different housing projects in order to identify the best practices and the area's which require improvement. The knowledge gained could help build a framework for constructing affordable houses which are cost-effective, sustainable and have a higher quality and better performance.

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