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## The Importance of Design Process in Housing Quality

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### Abstract

In Malaysia, housing construction industry is moving towards quality. Many construction companies have implemented several Quality Management System (QMS) for instance ISO 9001 and TQM in managing projects to ensure the quality of products. However, aspect of quality in newly built housing are remains an issue. Thus, a survey had been conducted among three construction professionals comprising: private clients, consultants and contractors. ReHDe framework is finally formed with a list of 3 major construct factors and 14 possible variables for managing the quality of house are determined. Results show that by having a good project management practices in place, there will be a significant effect in reducing numbers of defects in housing sector. Design process has appeared to be one of the most important factors that contributing in housing quality. 4 sub factors namely constructability, drawing accuracy, variation and knowledge transfer have been identified and discussed in detail in this paper.

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### 1. Introduction

Housing is a basic need for all [1] and the good quality of design need to be ensure for the satisfaction of homebuyer. This document is to discuss the the importance of design proses in determining the level

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of housing quality. Housing provision and quality housing are two issues, which remained the subject of research and interest to researchers' and designers'. Whenever a designer completes the project, they are not fully aware of consequences of their design [2]

At design stage, clients' involvement is needed to verify and to contribute necessary input to ensure the project is in the right track and to avoid variation. Variations can cause from client, standards or codes and changes in government regulations and laws. Therefore well planning documentation might help progress of work runs smoothly. It also works to optimise project resources and minimise surprises by getting the plan out early and allow corrective feedback.

In 2003, Andi and Takayuki Minato from Japan found the relation of design quality and quality of construction product. The result of study shows that the problems of defective designs are complex and deep rooted, influenced by many factors operating at individual designer, company, construction industry and global and national levels [3]. Poor performances of project were considered as a direct result of design documents deficiencies [4]. Andi found insufficient design time and fee for design work are the two key factors affecting design document quality. He also noted that design constructability also occurred as problem due to lack of construction knowledge on the designer side need to be given an attention. The latter study on the aspect of design quality stated that the better understanding of client's need may help designer to produce a design to satisfy client as well as standard without neglecting the importance of design constructability [5].

Because of drawings act as communication medium between clients to consultant and between consultant to contractor, lack in clarity, accuracy and detailing of design for example cross sections details of structural elements, joints, plumbing and electrical connections may contribute to drawing's misinterpretation that lead to defect. Therefore, drawings and other types of communication must be systematically documented and well organized to make sure the process of information transfer works effectively.

## 2. Literature Review

### A. Design Stage

The importance of the design process was realised that 80% of the construction cost was taken as soon as the design sketch was made. He also discovered that any mistake or omission that was not discovered or settled earlier could lead to serious demand and rework when the construction starts. In addition, the cost for a mistake in design would cost more than a mistake caused by construction because any deviation in design would increase the project cost in terms of repair and rework costs [6] More than 50% of changes in orders are caused by faulty design.

Realising this importance, several researches were made such as in Kuwait by Kartam (2001) that found out faulty design is one of the main factors that contributed to the disturbance of the project's smoothness. The same went for Japan [3]and in Hong Kong [7].

Meanwhile, [8] discovered that majority source of faulty cause began at design stage. Two main factors identified were weak technical specifications and overlooking of several specific requirements. This finding supported a research carried out by [9] which listed out the cause of defects which are design, specification, law, coordination, communication, supervision and constructability. There are some recommendations from publications which claim that defects cannot be avoided in construction products because of low attention towards quality in the design stage [10]. This happens due to the designer team's initial interpretation towards the clients' idea and the use of drawing as the main communication medium between project players.

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