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THE POTENTIAL OF CARBON FOOTPRINT REDUCTION OF A MID-RISE RESIDENTIAL BUILDING IN SARAWAK

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DECLARATION

"I declare that this Final dissertation is the result of my own research and that all sources are acknowledged in the references."

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ABSTRACT

Carbon emission is released into the atmosphere as the result of various activities due to rapid urbanisation and thus contributed to global warming and climate change. Various initiative has been done by the government in the effort to reduce the impact in relation to the construction industry, such as the implementation of 20% of purchases of green-labelled products or services by 2020. In order to reduce the carbon footprint of a building, several strategies like the Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST) have been established to promote green building development. The government policies and their commitments are formulated to support the carbon footprint reduction of 40%. Recent studies suggested that the selection of sustainable materials can reduce the overall carbon emission of a building; however, the cost has been identified as the main barriers to implement the initiative in Malaysia. The aim of this study is to analyse the potential of carbon footprint reduction by using sustainable material in mid-rise residential building and subsequently to evaluate the cost implication. The objectives of this study are to investigate and quantify the carbon footprint of a mid-rise residential building in Sarawak and to assess the potential for carbon footprint reduction of sustainable materials in comparison to conventional materials and subsequently to determine the cost implication of using sustainable materials for a mid-rise residential building. The impact of the conventional and the selected sustainable materials were assessed using data from the MyCREST tool and the data for cost analysis were taken from various sources of cost data such as JKR Rates online (RATOL), JKR Sarawak Schedule of Rates (SOR), and previous research. Based on the study, it showed that the sustainable materials such as 30% of Blast Furnace Slag (BFS) concrete mixture, Aerated Autoclaved Concrete (AAC) block, and recycled steel roof truss has the potential to reduce the carbon emission throughout the process of the building construction. Therefore, the potential of carbon emission reduction approach

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

This chapter consists of the overview of the dissertation. It consist of problem statements, aim and objectives, the methodology implemented, the scope of study and limitation of study and finally, the summarisation of this chapter.

1.2 BACKGROUND OF THE STUDY

Carbon emission is the amount of carbon dioxide (CO_2) released to the environment as a result from various activities in the construction industry due to rapid urbanisation; thus, it contributed to global warming and climate change (Fujita, Matsumoto and Siong, 2009; Ramachanderan, Venkiteswaran and Tze, 2017). The greenhouse gas (GHG) emission from fossil fuel usage has been increasing at an alarming rate towards the increased mass of CO_2 causing the rise in global warming which has directly affected the atmosphere in recent decades (Florides and Christodoulides, 2009).

However, carbon emissions are one of the most significant results from the fossil fuels industry (Buchanan and Honey, 1994). Ress, Wackernagel and Testemale (1996) identified that the carbon footprint reflects for a specific volume of GHG emission that is pertinent towards the global heating and is linked with human construction activities. Also, the effect of CO_2 on climate change is the most significant impact and thus, the most important to be concerned in order to improve the environment system (Sodagar and Fieldson, 2007).