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THE SIGNIFICANT DEFECTS OF CONCRETE FLAT ROOF AT HIGH-RISE BUILDING

Dissertation submitted in partial fulfilment of the requirements for the award of Bachelor of Quantity Surveying (Honours)

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ABSTRACT

The construction of high-rise buildings is rapidly growing in Malaysia due to the limitation of land, especially in the urban areas. In addition, The concrete flat roof is frequently used in the construction of high-rise buildings in Malaysia. It is because the pitched roof is seen to be disproportionate to any tall building from a philosophical standpoint. The concrete flat roof defects in high-rise buildings give critical impacts on the performance and life cycle of the buildings in the future. The roof is the main element of a building that protects the occupancy from the weather. The roof has high exposure to the weather. Therefore, improper design and constructability of the concrete flat roof would lead to poor performance of the roof of the buildings. This study aims to identify the significant defects of concrete flat roofs in high-rise buildings. The objective of this research study is (i) To determine the significant defect of concrete flat roofs in high-rise buildings, (ii) To identify the factors that contribute to concrete flat roof defects, and (iii) To propose strategies for reducing the significant defects occurs on concrete flat roof in high-rise buildings. This research study was conducted by implementing a quantitative method, which consists of a questionnaire survey to acquire data. A total of 196 sets of the questionnaire had been distributed to the contractors' companies Grade 1 to Grade 7 who specialised in roof construction in Kuala Lumpur. However, there was only 121 sets of the questionnaire had been returned and analysed in this study. The collected data were analysed by using SPSS software version 28.0. The goal of this research is to discover the significant defects that arise on the concrete flat roofs of high-rise buildings in Kuala Lumpur, as well as to identify the causes of the defects and find solutions to this issue. According to the current findings, the defects resulted from water stagnation, mouldy surfaces, leaking, waterproofing defects, cracking, and blistering. The quality of material used, and lack of manpower skills are the main factors that contribute to the concrete flat roof. However, the contractors agreed that all of the significant defects can be reduce by

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TABLE OF CONTENT

CHAPTER 1: INTRODUCTION

1.1 OVERVIEW

One of a building's most significant components is the roof assembly. It is a set of interconnected components used as part of a building's envelope to shield the building's interior, contents, and human occupants from external weather such as rain, wind, and sun. Pitch roofs and flat roofs are the two types of roofs available. compared to the pitched roof, the flat roof's slope is lesser than 10 degrees permits a variety of activities. The roof area is usually more than enough to accommodate service equipment such as cooling towers, domestic, fire, and air-conditioning water tanks. As a result, the roof concrete must be designed and installed to absorb any vibration caused by the equipment, as well as a membrane layer to prevent possible leakage. Due to the average appearance of the building structure and the visual impact of a flat roofline, flat roofs are constantly used for high-rise buildings in Malaysia including office buildings (Salawati, 2009)

However, according to Kot et al (2016) owners of high-rise buildings have frequently recorded roof leakage issues, especially in Malaysia which had a tropical climate. Salawati (2009) stated that Malaysia is a hot and humid country with a year-round mean temperature of 26 to 27 degrees Celsius with a relative humidity of 70 to 90 percent. Malaysia rainfall averages 250-300cm per year. Every year, the rain in Malaysia intensifies during the monsoon season (Suhaila et al, 2010). Sarman et al (2015) stated that surface-related defects, damage to the waterproofing membrane, and cracks in the roof parapet wall are typical roof construction defects that requires regular maintenance. This is due to the hot and humid environment in the equatorial climate during the year. Hence, the implementation of a flat roof requires a proper design and regular maintenance of the roof to prevent any damage caused by temperature changes. Based on Kot (2016), there were instances buildings have