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Barriers and Impact of Mechanisation and Automation in Construction to Achieve Better Quality Products

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Abstract

The major concern to the construction industry in general, would be the decreasing quality and productivity of end products; labour shortages; occupational health and safety; and allowing work to be performed where people cannot do. This paper discusses how the quality of life may be achieved by tackling the barriers and their impact to this initiative which could improve the industry in terms of productivity, safety and quality. This will also ensure the harmony between the environment and energy management with productivity enhancement for better quality products that could lead to better quality of life for the end users.

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1. Introduction

The construction industry is large, pervasive and acts as the bellwether of economic growth. Periods of national prosperity are usually associated with high levels of construction activity (Clough et al., 2000). The construction process requires the contribution of many different stakeholders and involves various processes, different phases of work, and a great deal of inputs from both the public and private sectors (Abdul-Aziz and Mohmad, 2010). The construction industry is complex and has become more so during the late 20th century. This complexity is due to the failure of planning mechanisms and the apparent inability of plans to represent the reality of on-site construction. The construction, housing, and property sectors play an important role in the Malaysian economy.

One option to address the construction industry problems is to move towards industrialisation by adopting mechanisation and automation in the construction industry. In the construction industry, time is money. Since mechanisation and automation are considered faster than humans at work operations, contractors should expect to complete projects sooner when using these technologies. Industrialisation is a part of a wider modernisation process through the revolution and the development of modern methods of production and technology system, mainly factory production (Lessing, 2006). One of the most influential studies on industrialisation categorisation in construction was the work by Roger-Bruno Richard (2005).

Technology is changing and developing around the world at a rate and pace never experienced before. Construction is one of the largest industries in both developing and developed countries in terms of investment, employment and contribution to GDP. Its impact on the environment is considerable across a broad spectrum of its activities. For this matter, the construction organisations have aggressively embraced new technology in order to remain competitive in the current market (Alshawi et.al., 2010).

The industry is also struggling to cope with issues related to performance, productivity, environment and health and safety, and to deal with the influx of foreign labour in construction sites. Azman et al., (2010), have stated that in the context of the Malaysia, the construction industry has currently been transformed into a mass production developing the standardisation of products in line with the global market. Furthermore, as mentioned in a study by Mohammad et al., (2014) the construction industry is highly concerned with addressing the evaluation of manufactured products in relation to enhancing sustainability and waste generation.

Therefore, this study aims to learn about mechanisation and automation among industry players regarding barriers and their impact, as well as their knowledge about mechanisation and automation. This study may complement precedent studies and contribute to a better public awareness of mechanisation and automation implementation in Malaysia.

2. Literature review

2.1. Overview of mechanisation and automation

Mechanisation can be described as the process of applying the use of mechanical plants in carrying out a task. The level of mechanisation is defined as the number of plants and equipment employed or the number of activities carried out by mechanical plants in an operation (Idoro, 2008). It can also be defined as the act of implementing the control of equipment with advanced technology, usually involving electronic hardware. According to Parker (1989) and Navon (1996) automation is defined as “the replacement of human labour by machines; or the operation of a machine or device automatically, or remote control”. Automation can also be defined as a self-regulating process performed by using programmable machines to carry out a series of tasks. Automation goes one step further than

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