Chapter 10
Integration of Building Information Modelling (BIM) Into the Construction Project Scheduling

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ABSTRACT

Construction management assumes a crucial role in overseeing a project's time, cost, and quality, particularly in large-scale projects. Building information modelling (BIM) is expected to enhance construction management by providing improved insights. To refine construction management further, 4D BIM can be integrated into projects by incorporating time or schedule-related information into the model, thereby establishing a more structured workflow. The aim of this research is to examine the application of 4D BIM in construction management, showcasing the value of BIM brings to construction projects. Additionally, the research also establishes a 4D BIM scheduling process for residential buildings and develops a 4D project scheduling workflow within a BIM environment. The research methodology includes desk analysis based on a case study of a residential building in Malaysia. This research serves

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as a guide for developers and contractors in simulating and accessing construction sequence scheduling within the context of 4D BIM implementation.

INTRODUCTION

Construction management is a recognized professional service that provides effective oversight of project scheduling, coordination, cost, quality, safety, scope, and function on behalf of the project's key stakeholders from the early stages until completion. Construction management is compatible with various project procurement methods, including the traditional method, Design and Build, Design-bid-Build, and Public Private Partnerships (PPP). Therefore, construction schedules need to be meticulously planned to determine project duration and can be compared with measured performance (Gledson & Greenwood, 2016). However, preparing Gantt charts can be challenging without the aid of advanced software, especially when updates occur frequently. Construction professionals may find it confusing, as adding more activities or making changes to the schedule affects the entire chart. Traditional Gantt charts fail to incorporate other critical factors, such as the level of difficulty and resources needed for each task. Hence, the adoption of Building Information Modelling (BIM) can enhance the construction management process.

BIM is a model-based practice that enables users to efficiently manage building data. The 4-dimensional (4D) BIM was introduced as the next generation of construction management for developing schedules, detailed planning, and data analysis. The 4D BIM phase extends the progress of the 3D BIM model by incorporating the fourth dimension, time (scheduling), into the 3D model of the project (Daga, 2022). Construction professionals can adopt BIM scheduling by linking specific start and end dates to every activity involved in the construction project. Therefore, Bentley Synchro 4D will be analysed to increase awareness among construction professionals and promote good software development practices. BIM adoption implies 'the successful implementation whereby an organization, following a readiness phase, crosses the 'Point of Adoption' into one of the BIM capability stages, namely, modelling, collaboration, and integration (Succar & Kassem 2015). Although BIM is recognized as advanced technology in Malaysia, its full benefits have not been realized. The adoption of 4D BIM needs to be managed effectively to improve construction scheduling and planning. To fully leverage the capabilities of 4D BIM, it is proposed to conduct research on BIM implementation steps in the project lifecycle (Wang, 2015). The Malaysian Construction Management will determine the implementation of 4D BIM in future construction projects for the country's economy.

RESEARCH PROBLEMS

As Malaysia gradually embraces digitalization, 4D BIM becomes a convenient application for construction management, especially for developers, contractors, and project managers aiming to boost sustainable growth by spurring innovation. This technique has a high capacity to enhance project management and delivery, regardless of the project's size. However, the complexity of projects increases when managers face challenges involving trade-offs among various resources, such as time, cost, quality, safety, and the environment. Hence, BIM was introduced to Malaysian Construction Management, and its usage has increased over the years. Large Malaysian construction companies have recognized the