

Integrating Dependent Material Planning Cycle into Building Information Management: A Building Information Management-Based Material Management Automation Framework

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Abstract : The collaboration and integration between all building information management (BIM) processes and tasks are necessary to ensure that all project objectives can be delivered. The literature review has been used to explore the state of the art BIM technologies to manage construction materials as well as the challenges which have faced the construction process using traditional methods. Thus, this paper aims to articulate a framework to integrate traditional material planning methods such as ABC analysis theory (Pareto principle) to analyse and categorise the project materials, as well as using independent material planning methods such as Economic Order Quantity (EOQ) and Fixed Order Point (FOP) into the BIM 4D, and 5D capabilities in order to articulate a dependent material planning cycle into BIM, which relies on the constructability method. Moreover, we build a model to connect between the material planning outputs and the BIM 4D and 5D data to ensure that all project information will be accurately presented throughout integrated and complementary BIM reporting formats. Furthermore, this paper will present a method to integrate between the risk management output and the material management process to ensure that all critical materials are monitored and managed under the all project stages. The paper includes browsers which are proposed to be embedded in any 4D BIM platform in order to predict the EOQ as well as FOP and alarm the user during the construction stage. This enables the planner to check the status of the materials on the site as well as to get alarm when the new order will be requested. Therefore, this will lead to manage all the project information in a single context and avoid missing any information at early design stage. Subsequently, the planner will be capable of building a more reliable 4D schedule by allocating the categorised material with the required EOQ to check the optimum locations for inventory and the temporary construction facilities.

Keywords : building information management, BIM, economic order quantity, EOQ, fixed order point, FOP, BIM 4D, BIM 5D

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