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Planning of Construction Material Flow Using Hybrid Simulation Modeling

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Abstract : Discrete Event Simulation (DES) and Agent Based Simulation (ABS) are two simulation approaches that have been proposed to support decision-making in the construction industry. Despite the wide use of these simulation approaches in the construction field, their applications for production and material planning is still limited. This is largely due to the dynamic and complex nature of construction material supply chain systems. Moreover, managing the flow of construction material is not well integrated with site logistics in traditional construction planning methods. This paper presents a hybrid of DES and ABS to simulate on-site and off-site material supply processes. DES is applied to determine the best production scenarios with information of on-site production systems, while ABS is used to optimize the supply chain network. A case study of a construction piling project in New Zealand is presented illustrating the potential benefits of using the proposed hybrid simulation model in construction material flow planning. The hybrid model presented can be used to evaluate the impact of different decisions on construction supply chain management.

Keywords : construction supply-chain management, simulation modeling, decision-support tools, hybrid simulation
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