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BIM and modular construction - A review of the potential uses in design phase

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Abstract. Modular construction has been gaining increasing prominence in the construction industry, driven by the growing urbanization and the need to explore new construction systems in response to frequent labor shortages, resource optimization, and a lack of quality control in construction. The set of very specific and deeply rooted characteristics of traditional construction, coupled with the costs associated with modular construction, pose a barrier to opting for modular construction systems, a situation that needs demystification. This type of construction offers numerous advantages related to production, quality, speed, comfort, and a positive contribution to sustainability, but it contains unique characteristics that need consolidation to streamline processes and enhance simplicity in usage. This paper examines the integration of Building Information Modeling (BIM) in modular construction during the design phase, in addition to identify the technologies and methods currently using, as DfMA (Design for Manufacture and Assembly), ML (Machine Learning), CDE (Common Data Environment) and others, trying integrate this concepts in the design phase of this construction system. Collaboration among construction professionals and data integration throughout all project stages are crucial elements for the successful combination of BIM and modular construction. This proposed approach introduces various current tools based on the BIM methodology for the specific development of projects for this type of construction system, relying on literature review and input from industry experts. Additionally, the paper identifies promising research areas and opportunities to further refine this integration, aiming to improve efficiency and quality in the construction industry.

Keywords: *Modular Construction, Building Information Modelling, Industrialization, Design Phase*