

Improving failure risk by better planning and safety for precast beam-to-column connection elements using physical internet-enabled building information modeling technology: a Malaysian case study

Abstract

Purpose: The purpose of this paper is to show that the growing global trend of quality assurance indicates the potential of precast concrete (PC) to improve construction quality and productivity, reduce wasteful construction, and achieve design standardization and to accelerate construction time. However, its current approach for dynamic characteristics, such as stiffness and displacement on beam-column connection system design, is not effective in achieving the required quality and operational requirements. **Design/methodology/approach:** A design tool based on the literature and data analysis in product planning and safety is proposed for the practice of PC building construction. **Findings:** The results reveal the need for improvement of PC building performance in the construction industry, especially for the beam-column connection system. The issues include improper design, improper specification and defective concrete and steel components compared to other manufacturing methods. **Originality/value:** A novel and sophisticated technique based on physical internet-enabled building information modeling (PI-BIM) is proposed to improve the planning process and safety for PC buildings in Malaysia. © 2022, Emerald Publishing Limited.

Keywords

Beam-column connection; Physical internet-enabled building information modeling; Precast concrete; Product planning; Safety