Coupling Parametric Design and Robotic Assembly Simulation to Generate Thermally Responsive Brick Wall.

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Abstract

Recent studies involving advanced custom brickwork configurations using parametric and performance-based approaches in hot arid climates have demonstrated the effect of thermal mass on energy performance, with limited evidence of factors like bonds, patterns and extrusions. This paper addresses generating low-cost thermally responsive masonry walls based on solar radiation data by coupling between thermal simulation using parametric design and robotic assembly simulation. Grasshopper script was used to automatically translate wall configurations resulting from DIVA/ArchSim simulations into robotic assembly simulation using KUKA parametric robot control (PRC). This coupling approach offers unlimited wall texture variation, context responsiveness, and wall construction efficiency and precision as relates to thermal performance.

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