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Postprint of Study on Pushover Performance of Fully Bolted Prefabricated Concrete Wall Panels with Boot-Shaped Embedded Connectors

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Abstract

To achieve industrialized production and rapid construction of reinforced concrete wall panels, a fully bolted connection technology utilizing boot-shaped embedded parts is proposed. Horizontal pushover tests were conducted to investigate the failure modes, stress distribution, and mechanical behavior of this novel connected concrete panel. The results indicate that the failure mode of the new prefabricated wall panel is diagonal shear failure of concrete around the embedded parts, with specimens demonstrating favorable load-bearing capacity and connection performance. The addition of U-shaped embedded parts at mid-span enhances the specimens' load-bearing capacity, stiffness, and ductility while reducing shear slip at panel joints. Based on experimental results, a finite element model of the novel prefabricated wall panel was developed, showing good correlation with test data. Through theoretical analysis, a calculation formula for the horizontal shear capacity of this new prefabricated wall panel is proposed.

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