

Mixed Construction of Modular Steel Frames with Concrete Shear Wall Systems

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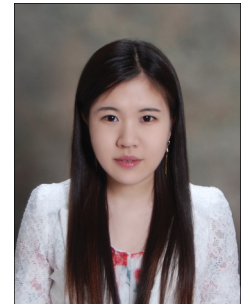
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Summary

Higher modular steel frames require lateral resisting systems against wind and earthquake loading. Modular steel frame systems have provided one of alternatives for rapid constructions such as school buildings, hospitals, emergency shelters, and dorms in a short time. For ease of construction in field and the allowance of tolerance of connection fabrication one intermediate diaphragm floor subsystems are introduced between steel modular systems and concrete core walls. The load transfer between these two systems is made possible by satisfactory performance of diaphragm action with reliable structural connections among subsystems. Commonly used anchorage connection details using embed steel plates welded to reinforcing bars were prepared to investigate structural performance of load transfer between the floor frames and concrete core walls. Tensile and shear resistance of wall connections are supposed to control the strength of the subsystems. Tensile and shear failures between embed plates and reinforcing bars are expected as one of governing failure modes between two subsystems. The experimental program of cyclic behavior was performed to investigate the structural performance of the proposed subsystems subjected to wind and moderate earthquake loading which can be applied to construction of the medium height residential modular buildings near future. To intend favorable failure mechanisms in the load transfer between the subsystems, failure sequences and ductile failure modes must be controlled. The proposed load transfer subsystem provides one of alternative for facile construction methods for mixed type of modular systems and stable structural performance.

Keywords: modular steel frames; connections; concrete core walls; subsystems

1. Introduction

Modular systems have been one of alternatives for quick construction such as school, hospitals, and temporary shelters after hazard. Unit modular systems are fabricated in factories in appropriate dimensions for transportation and on-site construction. Buildings are completed by connections