PUNCHING SHEAR RETROFIT OF REINFORCED CONCRETE FLAT SLABS SUBJECTED TO STATIC AND REVERSED CYCLIC LOADS

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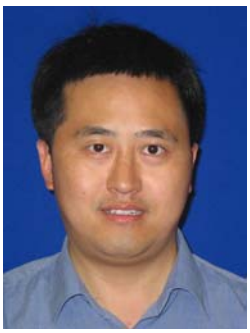

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Summary

The paper presents research program on retrofitting reinforced concrete slab-column connections to increase their punching shear strength and ductility in seismic regions. The current testing program includes five specimens, with and without shear reinforcement. The goal is to experimentally study the efficiency of shear bolt retrofitting technique in preventing collapse of flat concrete slabs in seismic regions. The proposed technique using shear bolt reinforcement allows repair and strengthening of existing, previously built flat reinforced concrete slabs supported on columns, which do not have adequate punching shear strength at the column area. A shear bolt consists of a headed vertical rod threaded at the other end for anchoring using a washer and nut system. The bolts are installed in holes drilled in a slab in concentric perimeters around the column. The presented results of the experimental work include large-scale interior reinforced concrete slab-column connections tested under vertical and reversed cycling horizontal loads. The hysteretic response behaviour is presented which shows how transverse reinforcements increase punching shear capacity, ductility and energy dissipation capability of slab-column connections. Discussion related to crack formation and propagation, deformations and strains in the reinforcements is included. The computed capacities of the specimens are compared to the experimental values.

Key words: punching shear, ductility, seismic retrofit, shear bolts, reinforced concrete, slab-column connections.

1. Introduction

The research presented in this paper involves experimental investigation of the performance of shear bolt punching shear retrofitting method for reinforced concrete slabs subjected to seismic-

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