SEISMIC PERFROMANCE ON MULTI-STOREY PRECAST BUILDINGS (IBS) IN MALAYSIA SUBJECTED TO LONG-DISTANT EARTHQUAKE EXCITATION

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MEI 2010

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ABSTRACT

Seismic performance of the reinforced concrete buildings in Malaysia need to examine their structural components under earthquakes excitation. The sub-assemblage of full-scale precast hollow core slabs together with supporting beams are designed, constructed, calibrated and tested under vertical cyclic loadings. The incremental drifts are applied at the end of the cantilever slabs. The load failure, mode of failure and structural damages are recorded and observed during experimental work. Initially, the cracks start from the joints and propagated on top of the slabs and finally, the slab snapped at middle together with delimination of the bottom fibre of the slab. Another experimental work is conducted on three sets of half-scale beam-column joint with different arrangements of reinforcement bars at the joints. These specimens are attached to the foundation beams and clamped to strong floor using eight high yield threaded rods of diameters 30mm. The specimens are designed, constructed and tested under reversible vertical cyclic loading until collapse. The joint with cross-bracing suffers the least damage as compare to others joints. By using the same specimens, the next step is to design the column-foundation joints under lateral cyclic loadings. Tension lateral cyclic loading is applied at top of the column with drifts of 0.1%, 0.2%, 0.3%, 0.4%, 0.5%, 1.0%, 1.5%, 2.0% and 2.5% at 2 cycles for each drift. Similar pattern of cracks and damages observed during experimental work as compared to the actual damages occurred during earthquake excitation. The first damage is due to unconfined concrete occurred between foundation beam and beam-column joint. The second damage is due to plastic hinge zone mechanism which occurs at column-foundation interfaces. These damages are due to the insufficient of longitudinal bars, the spacing between the stirrups are wider and spalling of concrete (low

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