Quantification of Slab Influences on the Dynamic Performance of RC Frames against
Progressive Collapse

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Abstract: Numerous studies have indicated that the practice of ignoring the contribution of RC slab in resisting progressive collapse is over-conservative, however the extent of influence of a slab, especially in terms of dynamic responses have rarely been studied. To quantify this effect, two series of RC beam-column substructures (DS and DF, with and without slab respectively) were subjected to a series of dynamic tests involving the sudden removal of a corner support. To further elucidate the dynamic response of RC frames against progressive collapse, the experimental data acquired in this study was compared to their respective static responses derived in a previous series of tests published in another paper. The dynamic effects were evaluated by the new defined term dynamic load increase factor (DLIF), which was defined as the ratio of SUS (static ultimate strength) to DUS (dynamic ultimate strength). The SUS of the test specimens had been captured in their respective static tests. However the DUS of each specimen could not be determined based on a single dynamic test. Thus, a Single-Degree-Freedom (SDOF) model was validated and utilized to conduct incremental dynamic analyses for each specimen.

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