



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI**SHORT ABSTRACT OF THESIS**

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SHORT ABSTRACT

Reinforced Concrete (RC) structural wall, also commonly known as shear wall, has large in-plane lateral strength and lateral stiffness by virtue of its large in-plane dimensions. So, these members are widely used in the lateral load resisting system of multistoried buildings in region with the possibility of strong earthquake shaking. In such frame-wall buildings, the walls are connected to floor slabs at different levels. Consequently, the junction region of shear wall and floor slab constitutes an important link in the load path from slab to wall in a highrise building. Due to the presence of slab, there is a local increase in the stiffness at the wall-slab junction which leads to stress concentration at that location. Although the behaviour of shear wall with the effect of coupling beams and coupling slabs has been investigated in the past studies, none of them has focused on detailed investigation of shear wall with the possibility of damage in the wall-slab junction and the adjacent floor slab. The possible influence of inelastic wall-slab junction response on the seismic design of shear walls also has not been studied. In the present study, a wall-slab assemblage is first proposed to represent the behaviour of shear walls, with connected floor slabs, in multistoried buildings. Based on displacement-controlled nonlinear static analysis, finite element model is validated with the experimental results of a previous study on behaviour of squat wall-slab assemblage under lateral loading. Parametric study is carried out using the proposed exterior wall-slab assemblage to understand the behaviour of wall-slab junction and to address the shortcomings of the current design requirements. The extent of the zone of inelastic behaviour, i.e., plastic hinge length is obtained at the wall-slab junction region by carrying out nonlinear static analysis of the wall-slab assemblage. Based on curvature distribution and variation of tensile damage along the height of wall, analytical expressions for plastic hinge length are proposed. Finally, nonlinear static analysis of wall-slab assemblage is also carried out to study the estimate the lateral drift limit of RC frame-wall buildings with rectangular structural walls. A drift limit in the range of 0.08% - 0.15% is recommended to avoid the damage at the junction region of shear wall and floor slab under strong earthquake shaking.