SEISMIC ASSESSMENT OF SHEAR-WALLS WITH ROCKING APPROACH

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Reinforced concrete wall-frame structures are widely used for buildings. When such structures are subjected to severe earthquakes, rocking and sway motions can be observed at the base of these structures. As a result, foundations supporting rigid structural wall could be uplifted under certain circumstances. It is widely known that the uplift of foundations reduces the damage of structural wall but additional rotation of structural wall causes significant damage to the adjacent frame. In order to study the basic performance relating to the uplift of structural walls, a time history analyses was conducted using a model consisting of a multi-story structural wall and an adjacent frame (Kyohei et al., 2008). Figure 1 shows the rocking of structural wall in two directions.

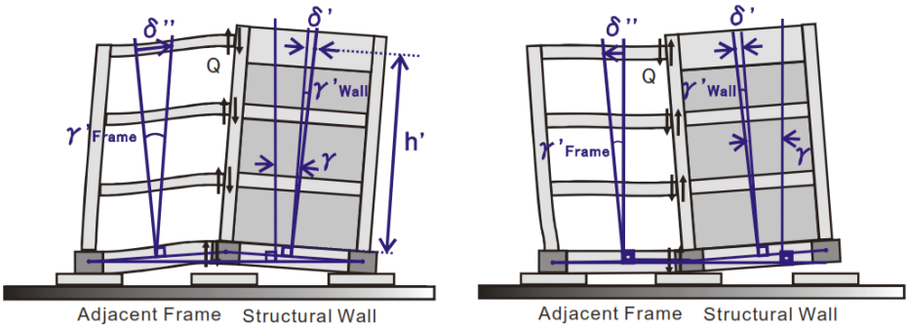

Figure 1. Controlled Rocking System (Kyohei et al., 2008)

The systems in Figure 1 are experimentally studied (Kyohei et al., 2008). The results of that study are used to verify the models in this study. In order to simulate this mechanism for a relatively comprehensive parametric study, nonlinear time history analyses are carried out using the SAP 2000 software.

In this paper, the seismic performance of the shear-wall frame was compared by changing restrain stiffness and properties of shear-walls. The response parameters are the axial force in the first floor column, the maximum horizontal acceleration in floors, and displacement in the top floor of the structure.

The displacement of the 1th and 3th floors in X direction with considering the rocking effects have been illustrated in Figure 2 and in Figure 3, the displacement in Y direction has been shown.

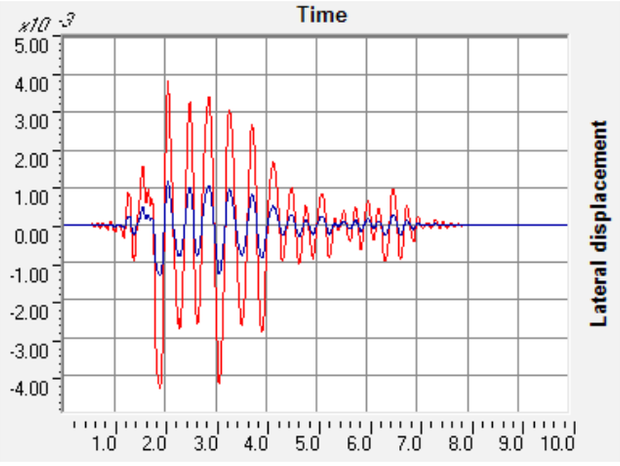

Figure 2. Lateral displacement of floors

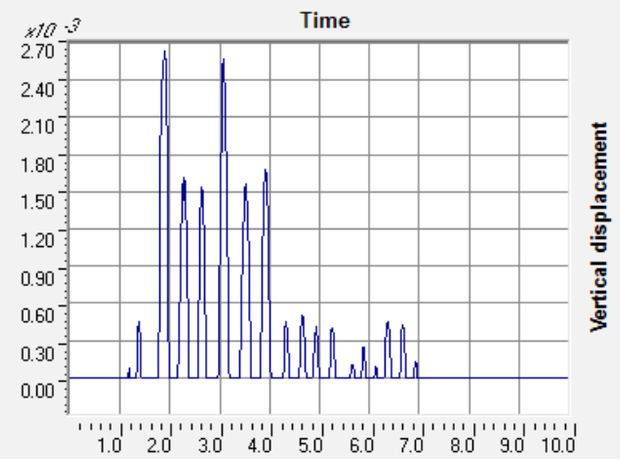

Figure 3. Vertical displacement of floors

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