NON-LINEAR DYNAMIC ANALYSIS OF A REINFORCED CONCRETE FRAME

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ABSTRACT

One of the objectives of earthquake engineering is to know the safety margin against structural collapse caused by seismic events. This requires to model reliably the behavior of the structures that undergo degradation in both strength and stiffness against such actions. In particular, the nonlinear behavior observed experimentally in reinforced concrete structures has proven to be difficult to reproduce in numerical simulations. Due to this, numerous material models have been proposed in recent decades for this purpose.

In this work, the responses obtained from the numerical model of a reinforced concrete frame are compared with those obtained experimentally. The experimental model was subjected to a seismic record of Chile Earthquake (1985), by mean of the shaking table in the Eartquake Pacific Engineering Research Center. In the numerical simulations, various nonlinear material models and failure criteria were employed. These material models take into account cracking by tension and crushing by compression in the concrete, as well as the nonlinear behavior of reinforcing steel. Finally, the correlation between the numerical and experimental results is established.