

SEISMIC PERFORMANCE EVALUATION OF RC SHEAR WALLS WITH IRREGULAR OPENING

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Reinforced concrete shear walls have been usually used as the main lateral load-bearing components in concrete building because of their rigidity, bearing capacity and high ductility. Openings are generally present in walls according to the intention of the services, doors and windows, in other words for provision of architectural design. The presence of openings influences on the seismic response of the walls. Although the using of opening in shear walls is common among practitioners, however limited research on walls with openings has established to investigate their effects on seismic response. In this line it is required to comprehensively understand the influence of opening parameters such as size, location on the seismic performance of walls and consequently building behavior.

The main objective of this study is to investigate the effect of irregular openings in concrete shear wall seismic performance. In this paper, a non-linear 3-D finite element analysis (FEA) model using ABAQUS was developed based on experimental data and calibrated with laboratory results of Yanez et al. (1991). In this FEA model, a damaged plasticity-based concrete model is used to capture the behavior of concrete under monotonic loading. It is shown that the proposed model can predict the behavior of concrete shear wall with irregular opening (Figure 1). Based on calibrated models, a parametric study is carried out and the effect of aforementioned parameters on seismic behavior of shear walls with opening is investigated. The results of analysis is compared with recommendation elsewhere and proposed new suggestions.

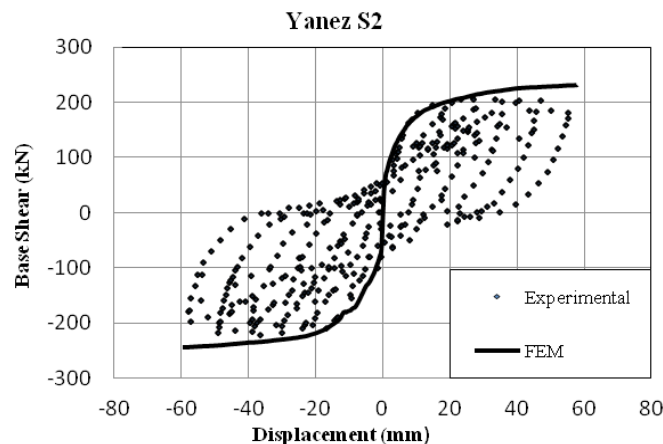


Figure 1. Experimental and analytical capacity curve for specimen S2

REFERENCES

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