

## Cyclic Nonlinear Analysis of Precast Concrete Structures with Steel Plate Shear Walls

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One of the most important determinants of securing the structures in seismic zone is reinforcement of the structures for resisting against the lateral loads. In the recent years, for reinforcing lateral load-resisting system, implementing applicable elements such as precast concrete and steel plate shear walls as a new approach has attracted many scholars in the area of construction industry. This scholarly attraction refers to the potential benefits of using these advanced operational techniques from the perspective of being affordable, expediting operations and flexibility. Reviewing the research background in the areas of precast concrete frame and steel shear walls reveals that in the past studies, the aforementioned elements have been studied separately and despite the attention of the researchers in the field of civil engineering, none of them have concentrated simultaneously on the systems of precast concrete frame and the steel shear together in their studies. Therefore, the present research focuses on the system of precast concrete structures with steel shear walls. In particular, the purpose of this study is to investigate the effect of steel shear wall as a lateral load-resisting element on precast concrete frames using cyclic analysis. In order to achieve the research objectives and performing cyclic analysis, the software of Opensees software was implemented. For this purpose, the relative behavior of precast concrete frames with a steel shear wall in building with different floors (3, 5 and 10 floors) and different beam-column connections (LRB, HRB, 4BC and 8BC) on the basis of stiffness, resistance, lateral displacement and behavioral coefficients parameters, were analyzed. Additionally, the behavior of precast concrete frame with a steel shear wall (with semi-rigid connection) and the behavior of a concrete frame without a steel shear wall (with rigid connection) in buildings with 3, 5 and 10 floors were examined on the basis of the aforementioned parameters. In general, the results generated by the analysis confirmed the positive and appropriate effect of steel shear walls on the lateral behavior of the precast concrete frame. The results of the research clearly showed that the use of steel shear walls in precast concrete buildings could reinforce lateral load-resisting system and could increase the safety of the structure in the seismic zones. Therefore, this research contributes to the literature by recommending the use of steel shear walls in precast concrete buildings and suggests further studies on this system.