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Simplified Computational Model for Post-tensioned Shear Walls

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Abstract

The shear walls fitted with the prestressed tendons that remain in an elastic state are termed, "Post-tensioned (PT) shear walls". These walls have the benefit of self-centering and reusability over conventional shear walls. These walls when fitted with energy dissipators increase the energy dissipation capacity of the walls and save them from any structural damage. Various analytical, experimental, and numerical studies have been undertaken in the past to study the behaviour and performance of the isolated PT shear walls. Though several computational models exist to study the behaviour and performance of these walls, the existing models are computationally expensive. Therefore, this study aims at developing a simplified computational model in SAP2000 that can be computationally inexpensive. The developed simplified model is compared with an ABAQUS model developed for a PT shear wall used in a past experimental study. The results show that the model satisfactorily matched the base shear versus drift behaviour as well as the model took very less time relative to the ABAQUS model. Also, the model developed in SAP2000 has the potential to be integrated into a building frame as SAP2000 is one of the most used software for building design and analysis. These fac-tors make the developed simplified computational model computationally inexpensive and have the potential to be used as a preferred choice of the computational model.

Keywords: Post-tensioned, Computational model, Numerical study