# Seismic Response of Multi-Storied Steel Building with Various Configurations Resisting Systems in Seismic Zone V in Egypt

**Mohamed M. Shabib[a], Hassan M. Farag[b], Yasser A. Khalifa[b], M. S. Zahran[b]**

[a] *P.G. Student, Department of Civil Engineering, Military Technical College, Cairo, Egypt*
[b] *Assistant Professor, Department of Civil Engineering, Military Technical College, Cairo, Egypt*

* Correspondence: shabib@mtc.edu.eg

**Abstract**. In recent years, structural engineers have focused on the dynamic behavior of lateral loads, particularly seismic loads, in multi-story buildings. Analyzing the consequences of earthquakes is essential to prevent structural collapse and damage. Resisting frames, shear walls, bracing, cores, tubular, and outrigger systems are among the best structural resisting systems to increase stiffness and decrease building seismic forces. This study investigates the effects of various configuration-resisting systems on the seismic forces of a 25-story residential steel building in seismic zone V in Egypt under the ECP201-2012 code requirements. The ETABS software is used to analyze seven proposal models using the finite element method in seismic zone V, with soil condition class A (rock soil). The results indicate that when compared to other structural models, it's found that Model 6 shows better results in story drift with a decrease to 16% and in maximum story displacement with a decrease to 20% of the results from the traditional building, the steel building with the viscous damping technique (VDT) shows better results in story drift with a decrease to 57.5% and 61.5% in the x and y directions and maximum story displacement with a decrease to 44% of the results from the traditional building, and by comparing (Model 6) and the system with VDT it's found that Model 6 shows better results in story drift with a decrease to 26.5% and 28.5% in x and y directions and in maximum story displacement with a decrease to 46.5% of the results from the model with VDT; therefore, Model 6 is considered the best configuration-resisting system to use in construction according to this case study.

**Keywords:** Response Spectrum Analysis, Seismic Zone, Shear Wall, Bracing System.

Content from this work may be used under the terms of the Creative Commons Attribution 4.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd