

## Tokyo Skyscrapers: Technologically Advanced Structures in Seismic Areas

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**Abstract :** The architectural and structural analysis of selected high-rise buildings in Tokyo is presented in this paper. The capital of Japan is the most densely populated city in the world and moreover is located in one of the most active seismic zones. The combination of these factors has resulted in the creation of sophisticated designs and innovative engineering solutions, especially in the field of design and construction of high-rise buildings. The foreign architectural studios (as, for Jean Nouvel, Kohn Pedesen Associates, Skidmore, Owings & Merrill) which specialize in the designing of skyscrapers, played a major role in the development of technological ideas and architectural forms for such extraordinary engineering structures. Among the projects completed by them, there are examples of high-rise buildings that set precedents for future development. An essential aspect which influences the design of high-rise buildings is the necessity to take into consideration their dynamic reaction to earthquakes and counteracting wind vortices. The need to control motions of these buildings, induced by the force coming from earthquakes and wind, led to the development of various methods and devices for dissipating energy which occur during such phenomena. Currently, Japan is a global leader in seismic technologies which safeguard seismic influence on high-rise structures. Due to these achievements the most modern skyscrapers in Tokyo are able to withstand earthquakes with a magnitude of over seven degrees at the Richter scale. Damping devices applied are of a passive, which do not require additional power supply or active one which suppresses the reaction with the input of extra energy. In recent years also hybrid dampers were used, with an additional active element to improve the efficiency of passive damping.

**Keywords :** core structures, damping system, high-rise building, seismic zone

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