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# Recent Developments and Applications of Seismic Isolation, Energy Dissipation and Vibration Control Technologies in North America

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An increasing number of tall buildings are being designed and constructed in high seismic regions of the US, and the use of structural control technologies is becoming more common for these types of structures. Damping systems, particularly tuned mass or liquid dampers, to enhance wind response characteristics are frequently used, and energy dissipation devices for improved seismic resistance of tall buildings are also being used; in some specific cases designer are also implementing systems that are effective in both the wind and seismic regimes. Selected recent and current projects will be discussed, with project examples in Los Angeles, San Francisco and Seattle on the U.S. West Coast, and Toronto in north eastern Canada.

The rate of implementation of seimic isolation in the U.S. has been slow in recent years, but there continue to be projects that use the technology. A selection of notable projects will be described, including several large, new buildings recently or soon to be constructed in extremely high-seismic settings. The first use of seismic isolation for a building in Canada was recently completed, the retrofit of an historic school building, and this project will also be described.

Code provisions for the design of seismically-isolated buildings have long been regarded by many as an impediment to the use of the technology. The recent 2016 edition update to ASCE 7, the design standard for building structures, includes a number of improvements to the isolation provisions that are hoped will ease regulatory challenges for future projects. In the non-building arena, a major update to the IEEE 693 standard for the seismic design of substations is nearing completion. This update includes an entirely new annex for the use of seismic protective systems, and is expected to contribute to a widening of the use of isolation and damping for electrical equipment. The main aspects of the ASCE 7-2016 provisions and the new IEEE 693 annex will be presented.