

Special Issue on “Japan’s Advanced Technology for Building Seismic Protection”



Kazuhiko Kasai

Professor, Tokyo Institute of Technology
Chair, Response Control Committee, Japan
Society of Seismic Isolation

Modern buildings have more complex, important functions than ever before, and damage to these functions adversely impacted on socioeconomic activity during and after the 1995 Hyogo-Ken Nanbu Earthquake that leveled much of Kobe, Japan. Although many such buildings protected the lives of occupants, their impaired functioning required costly structural and nonstructural repair.

Questions have been raised about conventional building structure performance enabling inelastic deformation or considerable damage during a major earthquake, as shown in **Fig. 1a**. Advanced technology such as building base isolation, shown in **Fig. 1b**, and passive control by dampers, shown in **Fig. 1c**, was developed prior to the Kobe disaster and became rapidly accepted after it, in line with a strong desire to better protect structural and nonstructural components. In base isolation, a building is placed on a flexible isolator that ab-

sorbs lateral ground movement, preventing vibration in the upper parts of the structure, as shown in **Fig. 1b**. In passive control, dampers connected to the structural frame dissipate seismic input energy, reducing kinetic energy and vibration of the building, as shown in **Fig. 1c**.

Such advanced technology is currently used for all major buildings and even for small residences in Japan to better protect buildings and their contents. Japan has produced a large number of buildings with the technology, and is believed to have conducted the most extensive research in realizing base isolation and passive control schemes.

This special issue of JDR addresses the present and future of Japan’s advanced technology with special reference to major activities related to design, construction, and research. Its purpose is to globally disseminate and share knowledge on promising schemes to help protect lives and social

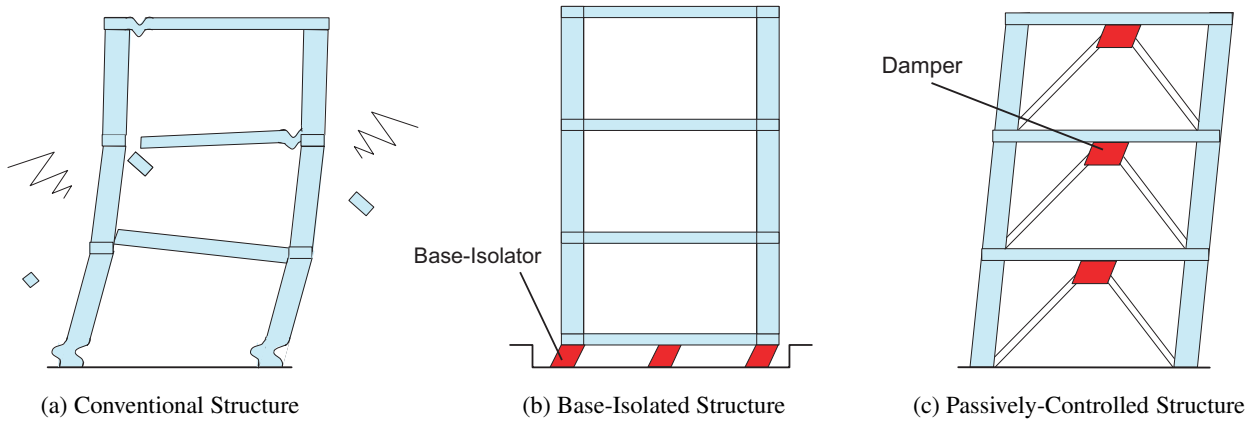


Fig. 1. Deformations of building structures under a major earthquake.

assets against catastrophic earthquakes.

This issue covers the current status of base isolation and passive control schemes, unique projects promoting technology for structurally challenging cases, building requirements necessitating the use of advanced technology, the status of current

codes and specifications, and new directions in technology.

Papers in this issue were authored by leading structural designers and researchers in Japan, to whom we hereby express our deepest gratitude for their invaluable efforts.