

8. Application of All-round Base Isolation System to an Actual Structure
- Confirming the Performance of Viscous Dampers against Micro Vibrations -

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The conventional damping devices adopted in seismically isolated buildings cannot perform enough damping effects in micro-vibration. The authors developed a special viscous damper that reduces the micro vibration response of seismically isolated buildings. This damper incorporates multilayer resistance plates within a viscous fluid to achieve highly effective damping against the quite small displacement amplitudes generated by micro vibrations. The first seismically isolated facility incorporating this damper is a two-story isolated building that features a steel frame structure supported by 18 rubber bearings and six sliding bearings with rubber bearings. Four oil dampers suppress movement in each of two (X and Y) directions against earthquake forces, while two viscous dampers suppress micro vibrations.

We performed forced vibration tests and made microtremor measurements for a newly developed viscous damper designed to reduce micro vibration response, comparing response-reducing effects under different conditions with and without the dampers. The results confirmed the damping efficacy of this base isolation system when combined with conventional isolation devices and special viscous dampers designed to address micro vibrations.

Key words: seismically isolated building, precision equipment, viscous damper,
micro vibration response, forced vibration test