

LATEST TRENDS IN SEISMIC ISOLATION IN TURKIYE

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Türkiye, situated in a seismically active region, began using seismic isolation technology in 1991 with the construction of the Bolu Viaducts. Over the years, its application expanded to bridges, industrial structures, hospitals, airports, and even historical buildings. Key milestones include the first seismically isolated hospital (Kocaeli University Hospital, 2001) and the introduction of a government mandate in 2013 requiring seismic isolation in state hospitals with over 100 beds in earthquake-prone areas.

In addition to hospitals, seismic isolation has been applied to data centers, ensuring the safety of critical digital infrastructure. Companies like Turkcell and Akbank have incorporated this technology into their data center facilities. The residential sector has also begun adopting seismic isolation, with projects like the Maveria Comfort Apartments in Istanbul. Historical structures, including the Zeynel Bey Tomb and Nusretiye Clock Tower, have also been retrofitted with seismic isolators to preserve them.

Seismic isolation became more standardized with the 2018 update to the Turkish Building Seismic Code, which included specific guidelines for seismically isolated buildings. Until 2023, Türkiye had 104 seismically isolated building-type structures, with hospitals making up the majority of projects.

The devastating earthquakes of February 2023 (magnitudes 7.8 and 7.6) tested Türkiye's infrastructure, including its seismically isolated hospitals. A study by the Turkish Association for Seismic Isolation (TASI) assessed eleven such hospitals in the affected region. The results confirmed that these hospitals performed exceptionally well, remaining functional with minimal structural damage. Most used curved surface friction isolators, demonstrating the technology's effectiveness in reducing seismic forces. Seismically isolated Malatya Battalgazi State Hospital was fully functional and serving as a shelter immediately after the earthquakes while the conventionally constructed fixed base Türkoğlu State Hospital suffered severe non-structural damage during the 2023 earthquakes.



Figure 1 Malatya Battalgazi State Hospital



Figure 2 Türkoğlu State Hospital

While many conventional hospitals suffered significant damage, seismically isolated hospitals continued operations, ensuring uninterrupted medical care. For instance, Kahramanmaraş Elbistan State Hospital very close to the epicenter of the earthquake, equipped with 455 double curved friction isolators, remained fully functional with negligible damage. These findings reinforce the critical role of seismic isolation in safeguarding essential facilities during major earthquakes.

The earthquakes marked a turning point for seismic isolation adoption in Türkiye. Public awareness increased, as many realized that even buildings constructed under seismic codes were vulnerable. The high performance of seismically isolated hospitals led to greater interest in this technology, especially in the residential sector. Before the earthquakes, only a few residential buildings incorporated seismic isolation, but after February 2023, 34 new projects were initiated across the country.

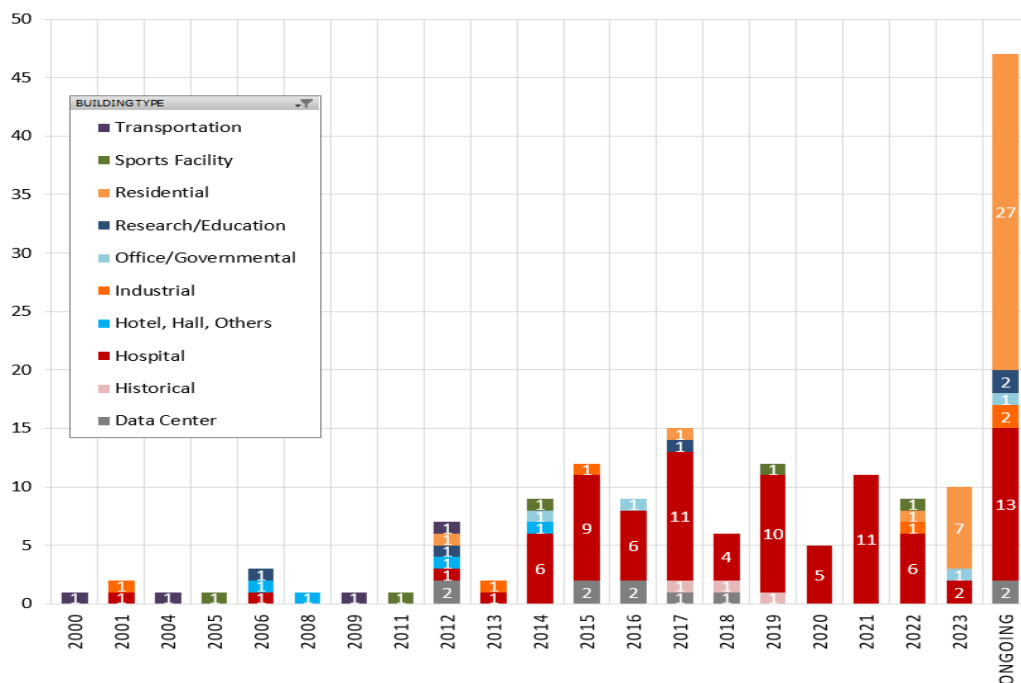


Figure 3 Annual growth of seismically isolated projects in Türkiye

Seismic isolation is also gaining traction in other industries. A jewelry atelier in Istanbul is using the technology after a similar complex in Kahramanmaraş suffered severe damage, exposing valuable materials. Contractors struggling with economic challenges have also begun using seismic isolation as a marketing advantage, appealing to buyers prioritizing safety.

The 2023 earthquakes underscored the effectiveness of seismic isolation in protecting critical infrastructure and ensuring continuity of essential services. Türkiye is experiencing significant growth in the adoption of this technology, driven by increased public awareness, government support, and advancements in seismic isolation engineering. The widespread implementation across hospitals, data centers, historical buildings, and residential complexes highlights its versatility and importance in creating a more earthquake-resilient built environment.