

Together with our customers

In their own words

Pioneering seismic control and isolation systems employing THK technology



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NIKKEN SEKKEI LTD.

Founded in 1900, Nikken Sekkei is Japan's foremost comprehensive design firm. With vast expertise in construction design and supervision and urban planning, Nikken Sekkei provides a range of services that includes surveying, planning, and consulting. Its ongoing efforts have helped to improve construction and enhance the societal environment for over 110 years.

Q How did your firm become interested in seismic isolation?

Not only NIKKEN SEKKEI but the whole construction design industry became interested in seismic control and isolation as a result of the Great Hanshin-Awaji Earthquake in 1995. Before that we had prided ourselves on having the world's most advanced quake-resistance technology, but then we saw the unexpected damage caused by that earthquake. From that point on seismic isolation devices and vibration-damping seismic control, which are more effective than previous quake-resistance methods, became incorporated into the construction of office buildings on a full scale. These days, to a great extent, seismic isolation and control are part of the process from the design stage on.

Q What's your assessment of THK's seismic isolation devices?

Based on readings taken from seismographs installed in many different locations, Professor Nobuo Fukuwa of Nagoya University* has determined that most earthquakes in the Nagoya area have a predominant period of three-to-four seconds. This, he discovered, poses problems, because conventional seismic isolation devices generally employ laminated rubber that also has a three-to-four second vibration period, which could cause sympathetic vibration during an earthquake. Plus, rubber can only undergo a limited amount of lateral deformation, a few dozen centimeters at most. With a large building, the rubber component has to be larger as well, which makes it more rigid. We were looking for a seismic isolation device that could lengthen the period and absorb tremors, and we received some information about THK's seismic isolation systems. They can accommodate lateral displacement of up to one meter, which expands the possibilities for use. That's why they could be installed to provide effective seismic isolation for an older structure like the Aichi Prefectural Office Main Building. The Aichi project, regarded as a highly successful effort to improve earthquake resistance, earned a commendation from The Japan Building Disaster Prevention Association.

* Professor Fukuwa discussed seismic isolation technology in an article in the 2012 THK CSR Report.

The construction of research facilities at the Aichi Prefecture site known as the Knowledge Hub Aichi posed special challenges, since the site is located directly over an active fault. Fortunately, it's a strike-slip fault, which generates lateral vibrations. By incorporating THK seismic isolation devices, which are especially effective at absorbing lateral vibrations, we were able to resolve that issue. There are no other products that would enable us to deal with such challenges, which is why we've used products from THK for our pioneering efforts in seismic isolation and control.

Q What do you expect from THK in the future?

Except when earthquakes have struck, there hasn't been any way to accurately assess the performance and effectiveness of seismic isolation systems, but that's changing. In March 2014 a new Disaster Mitigation Research Building, which Nikken Sekkei helped design, was completed at Nagoya University. The new building has a facility where powerful vibrations resembling earthquake tremors can be created, so various kinds of experiments will be performed there. It's entirely possible that these experiments will reveal some unforeseen problems. We'll be looking to THK, as a manufacturer of seismic isolation systems, to respond quickly to any challenges or problems that arise.



THK products in use at the Disaster Mitigation Research Building; the internal structure can be viewed from the outside.

The Disaster Mitigation Research Building.