NEWS RELEASE

構造計画研究所
KOZO KEIKAKU ENGINEERING Inc.

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KKE engineers win the AIJ Prize 2012
~Development and application of 3-D seismic isolation system ~

Kozo Keikaku Engineering (Head office: Nakano-ku, Tokyo, President & CEO: Shota Hattori, "KKE" hereafter), together with Shimizu Corporation (Head office: Minato-ku, Tokyo, President and Representative Director: Yoichi Miyamoto, "Shimizu" hereafter), has won the Architectural Institute of Japan (Located in Minato-ku, Tokyo, President: Akira Wada, "AIJ" hereafter) Prize 2012.

■ The awarded project

Prize: AIJ Prize 2012
Category: Building Engineering Division
Title: Development and application of 3-D seismic isolation system
Award winners:
Osamu Takahashi
General Manager, Structural Design Dept., KKE
Tetsuya Tomizawa
Senior Engineer, Structural Design Dept., KKE
Junji Suhara
Manager, Technology Dept. Nuclear Projects Div., Shimizu
Ryoichiro Matsumoto
Manager, Technology Dept. Nuclear Projects Div., Shimizu

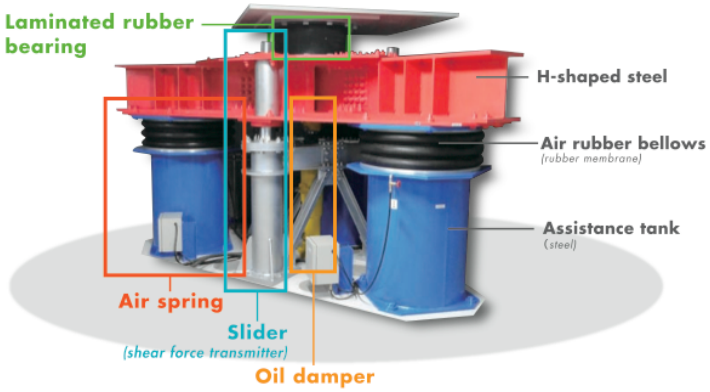
CHISUIKAN, the world's first building installed with 3-D isolators

As demands for countermeasures against earthquake surge after a severe earthquake such as the 2011 off the Pacific coast of Tohoku Earthquake, seismic isolation systems attract more attention in Japan than ever. Existing seismic isolation systems, however, are only effective to horizontal movement and hardly reduce vertical movement triggered by an inland earthquake, which means interior contents and/or equipment could be damaged seriously in case of inland earthquakes.

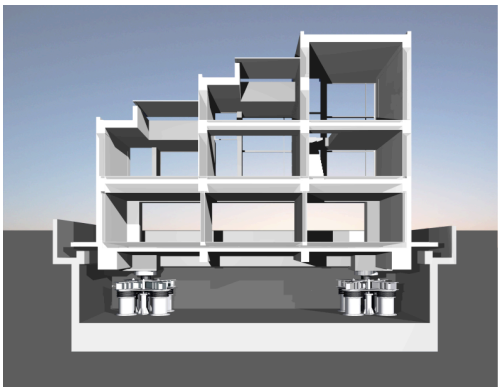
The award winners have worked collaboratively, and successfully developed a three-dimensional seismic isolation system, which reduces not only horizontal seismic movement, but also vertical one. The isolation system is now installed in a residential building called CHISUIKAN.

There are other three-dimensional seismic isolation systems that have been already developed and introduced to the market as "seismic floor isolation" that can be applied to a computer room or to stands in a museum. However, none were installed to support an entire building structure, which makes CHISUIKAN the world's first use case of three-dimensional seismic isolation systems to isolate an entire building.

The system comprises two main elements, a three-dimensional seismic isolation device and a rocking motion suppressing oil damper. The former device consists of three components, i.e. laminated rubber bearings, air springs, and shearing force sliders.



Structural overview of the system



Sectional view of CHISUIKAN

The CHISUIKAN building was completed in March 2011, right before the 2011 off the Pacific coast of Tohoku Earthquake. The observed record at CHISUIKAN proves that at the time of the Earthquake, the isolation system reduced the seismic acceleration by 44% horizontally, and by 28% vertically.

Owning to its high performance and efficiency, the three-dimensional seismic isolation system is found significantly useful for important facilities such as hospitals and shelters, which require continuous operation after disasters as earthquakes. The system is also considered to be beneficial in terms of business continuity planning, since it enables robust operation and securer environment for data centers and precision machine factories that house equipment and precise machineries.

Osamu Takahashi, one of the award winners said, “We strive to leverage the power of engineering to build a safer and securer society. Throughout all phases of the project, we owe a lot to Dr. Takafumi Fujita, a professor emeritus at the University of Tokyo, as well as Kayaba System Machinery Co., Ltd. We sincerely thank them for their passion, encouragement and assistance for our research.”

■ About AIJ Prize

AIJ awards great achievements every year to promote the advancement and development of the science, technology and art related to architecture and to heighten architectural quality in Japan. Each prize has its own criteria for awarding achievements. One of the criteria, “The Prize of Architectural Institute of Japan for Engineering”, was first presented in 2002 in order to award remarkable achievements that contributed in technological development in building engineering.
http://www.aij.or.jp/eng/prizes/index_p.html

■ About CHISUIKAN

CHISUIKAN is a three-storied building owned by KKE. Having its architectural design by Eiichi Sugiura Architect & Associates, structural design by KKE, construction by Shimizu, CHISUIKAN was completed on March 3, 2012 and serves as an experimental building for earthquake engineering and energy monitoring systems. It is composed of a seismic isolation pit in the basement and eight residential rooms in the superstructure.
http://www.kke.co.jp/en/product/catalogue/pdf/Chisuikan_ENG.pdf

■ About KKE

KKE is an engineering design firm established in 1959. Starting its business as a structural firm, KKE has developed the line of business in structural design and analysis, engineering consulting and system development for construction, tele-com, and manufacturing industries. The business pillars also include simulation and analysis of human decision making, quantitative measurement of human/commodity flow, and disaster readiness services including quake-resistant engineering, risk assessment, analyses on facility damage and business continuity, etc.
http://www.kke.co.jp/en

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