

3/11 special: disaster preparedness

KKE helps assess various risks

Established in 1956, Kozo Keikaku Engineering Inc. began as a specialist in the structural design of buildings. KKE was one of the first companies in Japan to use computers in its field. Recently, it has been involved in the structural design work of the Roppongi Hills complex in Tokyo as well as the Shanghai World Financial Center, both projects of Mori Building Co.

KKE's corporate philosophy of industry-academia collaboration continues since its inception, with a number of its staff conducting various joint research projects with university professors, participating in academic study meetings or returning to universities to obtain doctorates.

The company's scope of work has expanded over the years to include earthquake risk assessment as well as original computer software development to help simulate and analyze such risks.

"Out of the 600 or so employees in the company, 110 work as specialists in the construction field, a very high figure that probably rivals that of research institutes of large-scale general constructors in Japan," said Yuko Murachi, a senior consultant of the risk management section of the Disaster Reduction Consulting Department.

"The specialists in charge of construction, for example, will start by creating the original software that calculates how much vibration from an earthquake can be withstood upon the incorporation of various types of dampers or seismic isolators," she said. "The staff will then conduct the analysis from the planning stage to the completion of construction, advising and providing the best measures and solutions for the customer."

The department also has specialists working on evaluations of earthquake ground motion, tsunami simulation and probable maximum loss.



Yuko Murachi

"Many buildings in Japan have been constructed without thinking about such risk evaluation. Those who used to seek such multiple simulations were limited to super-high-rise buildings, seismically isolated buildings, lifeline corporations or exceptionally important government facilities," Murachi said. "The landscape is changing, however, and general customers such as manufacturing companies, data centers and financial institutions are starting to come to us, since they are exceptionally sensitive about their business continuity plans."

Especially after March 11, 2011, Japanese society has become keen to seek knowledge about earthquakes and what kinds of measures should be taken to minimize damage.

"For example, if a company has several plots of land as candidates for its new office, we define the active fault zone within a 300-km radius and map out the earthquake occurrence probability and seismic intensity of each plot of land owned. By providing easy-to-understand data, the client can then have a better understanding of his land for making the best decision on the respective use," Murachi said.

"When involved in a construction project, we start working together with our clients from the stage of architectural design. We

show various simulations, maps, charts, calculations, etc., on how a building shakes when hit by a local earthquake. Such data is shown for already constructed buildings, too. In that way, owners can make proper judgments on whether they can go on using their buildings as they are, or make reinforcements as a necessary precaution," she said.

Advanced research and development is the backbone of the department. Working with Japanese governmental research institutes, it strives to make the government's technical reports issued easier to understand for the public.

"The information is there, but reports by technicians are often too technical," Murachi said. "Our future task is to pro-

vide technological explanations and convey the true meaning of risk communication in an easier to understand manner. In that context, we are thinking more about the visualization method of seismic waves and so on, such as our current Web application system that shows real-time information on what kind of earthquake is occurring in which location.

"We can also associate our services with other technologies that KKE provides, such as evacuation and recovery simulation. Combining the strength of each team, we can support the decision-making process more efficiently and comprehensively.

"Toward the future, we hope to transmit such information properly in English, and prove our capability to the world in offering the most advanced disaster reduction consulting service."



Roppongi Hills in Tokyo is one of the complexes whose structural design was conducted by KKE. YOSHIKI MIURA