rexroth
A Bosch Company

A seismic shift

Enna University wanted to invest in seismic simulation technology that would allow researchers to test anything from reinforced concrete elements and larger antennas to smaller pieces of technology. Bosch Rexroth was able to offer a complete laboratory solution which can simulate the widest possible range of seismic activity for loads of up to 100 tonnes, so now the Enna University has the complete spectrum of seismic frequencies available. This means more flexibility and better results for researchers all over the world.

Accurate seismic simulation involves a lot of work, and a lot of moving parts. It's also a challenge to cover both high loads and high intensity in the same facility, as this usually requires separate pieces of equipment. Enna University wanted to be able to offer seismic simulation that could test anything from heavy equipment at lower frequencies to smaller items at extremely intense frequencies, which meant commissioning an entire laboratory dedicated to this kind of research with a variety of technology.

This kind of testing is essential for major construction projects around the world, as it influences how buildings are designed and how equipment is chosen. This means the potential market for the Enna University is significant, and this is why it was so important to find the best possible solution. Bosch Rexroth provided a technology specifically engineered to make the testing capability at the University of Enna amongst the best in the world.

INNOVATIVE SOLUTIONS

Bosch Rexroth provided the entire laboratory set, and there are three key pieces of technology dedicated to seismic simulation. On one side of the building there's an electrodynamic system which can shake loads at lower frequencies to test equipment in quasi-static conditions. On the other side there's a system called the Cube, which can handle smaller loads but shake them at much higher frequencies of up to 250 Hz. However, the most innovative technology lies at the centre of the lab.

"We built a double shaking table, that can either work as two separate tables or as one large table connected by a plate link," explains Antonio Capuzzi, Technical Director and Head of Sales Project Business for Bosch Rexroth. "When working together, this shaking table has a 40 m^2 surface with 16 hydraulic actuators which can shake it at frequencies of up to 60Hz with a 100-tonne load. This two-table system which can be joined to make one larger surface was designed specifically for the University of Enna. It was based entirely on their needs and requirements and makes this one of the top seismic simulation labs in Europe, and maybe even the world."

ATTRACTING RESEARCH

With the laboratory and technology in place, the University of Enna can offer the best seismic simulation to researchers all over the world. This not only helps create safer buildings and equipment that can cope better with earthquakes, but it also helps the university generate income to fund further technological developments.

"One of the key factors in Bosch Rexroth being chosen was the well-known performance of our hydraulic systems," says Capuzzi. "With our technology, it's actually possible to recreate the exact forces of the Kobe earthquake, which is incredibly useful in terms of testing. It means that you don't need to perform tests on smaller scales, which makes the research more accurate."

The University of Enna is happy with the solution, and happy with the feedback they're receiving from researchers. Some companies have said that it is the only facility that could do what was required.

A LEARNING EXPERIENCE

As this was new technology, coupled with the fact that the project was to provide an entire laboratory, there were challenges and difficult decisions along the way. However, Bosch Rexroth and the University of Enna collaborate in a positive, productive way, and all challenges were met with the enthusiasm and knowledge needed to overcome them.

"This was the first time we were making a system with this kind of performance," Capuzzi concludes. "There was a lot of analysis and redesigning, but now we have a whole system that can produce accelerations and forces equal to real earthquakes, and it's one of few that can really do this. From an engineering perspective this is fantastic, and now we have the competence and knowledge to be able to offer this to others as well."