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A Bosch Company

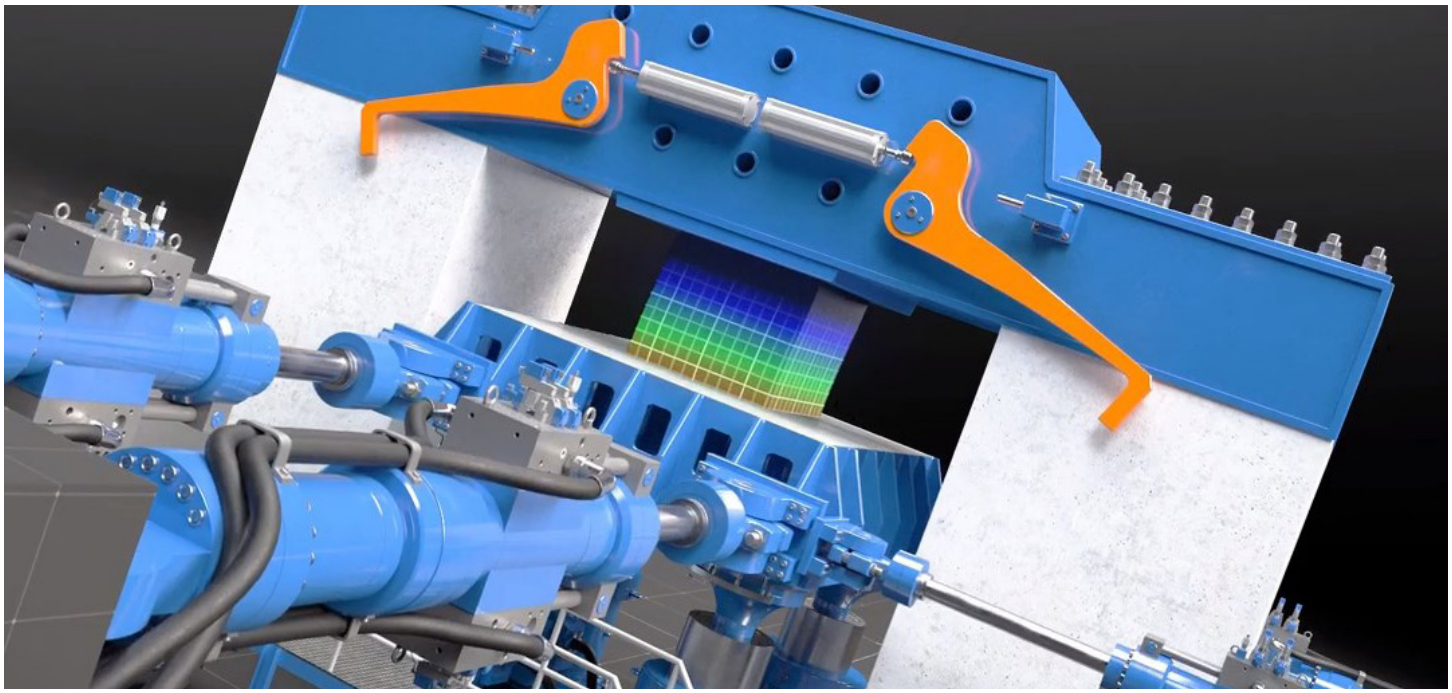
Testing isolation bearings

Known for expertise and excellence in engineering, the University of Messina was looking to invest in a seismic simulation system that could replicate intense lateral forces. This was mainly to support in the design and construction of the proposed bridge between Messina, Sicily and mainland Italy, but it's also open for use by anyone that needs to carry out this kind of research. The university chose Bosch Rexroth not only for the hydraulic technology, but also for the planning and construction of the entire building around this seismic press.

Isolators are an essential part of modern construction and civil engineering projects, especially when the structure is to be built in an area prone to earthquakes. They separate structures from the foundation, ensuring improved stability when it's needed most. Testing these isolators is extremely important, and it can be challenging as it requires a great deal of force and movement to accurately replicate what could potentially happen in the real world.

With one eye on testing isolators for the future Messina Bridge, and another on the potential market around the world, the University of Messina asked Bosch Rexroth to provide an innovative hydraulic seismic press, as well as the building where it would operate.

"We needed a construction partner for the building work," says Antonio Capuzzi, Technical Director and Head of Sales Project Business for Bosch Rexroth. "Everything had to be built in a way that could cope with the forces generated by our hydraulic press. Once that was in place, we could install our technology which can create huge amounts of pressure and lateral force. This technology is really innovative, especially our unique hydropads which can slide friction-free across surfaces to apply force with total accuracy."



FRICTIONLESS PROGRESS

When testing isolators, accuracy is extremely important. In order to generate the lateral forces required for thorough research, Bosch Rexroth designed a system built with four cylinders that connect to the isolator, or object undergoing tests, via a hydryopad.

The cylinders press the pad and object against a beam to accurately reproduce vertical force, while the hydropad moves across the test object laterally to test how it responds to this motion. Usually this would create a huge amount of friction, which creates inaccuracy in testing, but Bosch Rexroth designed a unique technology which allows the pad to move without the usual resistance.

“Vertical force is up to 1600 tonnes, with the tables on the side pressing with up to 500 tonnes, but our hydropad solution can still move without friction,” explains Giuseppe Ricucci, Project and Operations Lead at Bosch Rexroth. “We engineered it specifically for this project, and it is able to move like this as the system sprays oil on the surface consistently, to ensure that it can always slide as it needs to. The film of oil is just 75 microns thick, but you can move the 45 tonne table with just 100 kilos of force.”

UNMATCHED ACCURACY

The main benefit of this innovative technology housed in the building made especially for this system is that it can offer research capability beyond almost anything else in this field. From the forces generated to the friction free pad movement, everything is engineered to provide the best possible results for testing isolators.

The advanced technology and accuracy available mean that it’s not only construction companies that want to use this laboratory at the University of Messina. Other test facilities and component manufactures are also using the friction-free technology to test and calibrate their own equipment. This not only validates the system itself, but it also generates income for the institution.

A SATISFIED CUSTOMER

At the beginning of the project, the University of Messina outlined everything that they would like to include in this facility. Bosch Rexroth, alongside the building partner, was able to meet every expectation and provide true innovation which will drive this field forward. There are already enquiries from elsewhere about the hydropad technology, and this facility will be highly valuable to the Messina Bridge project when work is underway.

“This machine is really flexible,” says Ricucci. “Everything that needs to be tested with lateral forces can be tested here, and it’s really the only lab where it’s possible to test next generation hydropad technology with higher and higher loads. This means we can develop our own technology while offering customers proven, tested systems. The university is really happy with the end result, and now companies from all over the world are using this facility.”