

Success through smooth collaboration



Technology in trains is always advancing, with governments and companies around the world investing in newer, faster and more sustainable models. For these new trains to run smoothly and reliably, testing is essential.

The University of Huddersfield invested in a system from Simpro which can replicate very high speeds and forces, and Simpro asked Bosch Rexroth to provide the drive and control systems capable of the required performance.

High speed electric trains are becoming more popular as a sustainable, efficient way of moving people and goods around the world. These trains rely on pantographs for power, which are the systems that connect the trains to overhead power lines. It's essential for these pantographs to maintain connection to the power, as any lost connection can result in a huge arc of electricity melting and damaging the train and the lines.

The UK is known for innovation in train technology, and the University of Huddersfield asked Simpro to provide equipment capable of testing Pantographs at extremely high speeds. Simpro came up with the design, and asked Bosch Rexroth to provide all drives, controls and automation. The systems provided by Bosch had to be able to replicate speeds of 500 km/h, whilst also accurately recreating natural train movement.

“The railway testing world is ruled by so many different norms, and Simpro knows these,” says Antonio Capuzzi, Technical Director and Head of Sales Project Business for Bosch Rexroth. “They taught us how to apply and control our forces according to these norms, and they expressed what they needed in a really clear way. The result of this effective collaboration is a real masterpiece in design.”



COMPACT AND POWERFUL

Due to the specific requirements of the project, Bosch Rexroth had to use all of its engineering expertise and innovation to construct the drive and control systems for this equipment.

“All of our tech is here,” explains Giovanni Terlizzi, Project Manager at Bosch Rexroth. “Hydraulics, controls, electrical actuation, linear motion. We used everything to give the best possible results, and integrated it all within the Simpro lab design. The end result will provide the University of Huddersfield with a system which is ready to test the next generation of trains.”

For all of this technology to be truly effective, it all has to be synchronised and work seamlessly together. The Bosch Rexroth team managed to get the variance down to one micron, while continuing to provide the extreme performance that’s required.

NEXT GENERATION TESTING

The end result of this collaboration and engineering is a laboratory that is capable of testing the next generation of trains. It’s fully future proof, and is capable of horizontal movement of 2.7 m/s with vertical actuators moving at a frequency of 100 Hz. This can simulate up to 4 g, which is a real engineering achievement.

“Simpro chose to work with Bosch Rexroth because of our well-known quality and performance,” says Capuzzi. “For the end user, the university, they benefit from the expertise and innovation from two companies who are experts in their respective fields. This lab is extremely capable, reliable, and also compact which is a real positive. It’s a lot of performance packed into a relatively small, efficiently-used space.”

In addition to the performance, the system is extremely accurate. This is crucial for testing pantographs at these speeds and forces, as there’s very little room for error, but this technology ensures that the design of future pantographs will be based on accurate, reliable data.

LONG TERM PLANNING

The customer is happy with the performance, and both Simpro and Bosch Rexroth are extremely happy with the way the project has been executed. From the initial design phase to the commissioning and installation, a professional collaboration has characterized this project. Everything in this project has highlighted significant future benefits for all parties, from the forward-thinking performance for the university to the productive partnership between Bosch Rexroth and Simpro.

“This project was unique as it had everything,” says Giuseppe Ricucci, Project and Operations Lead at Bosch Rexroth.. “It’s so accurate and future proof, and it really pushes the limits. Universities tend to want equipment that’s suitable not just for the next few years, but for the next 20, and together with Simpro we were able to provide this.”