

NEXT GENERATION MOOG TEST CONTROLLER INSTALLED TO SUPPORT GLOBAL RAIL TESTING

Upgrade of Structural Test Laboratory at TA Savery, Coventry, United Kingdom

MARKET



Rail



Test

CAPABILITY



Global Focus



Support



Expertise



Modelling & Simulation



Training



Field Service

In November 2020 the UK Government published a Ten Point Plan for a Green Industrial Revolution and Point 5 covers Green Public Transport. Integral to this is the continued electrification of UK railway lines, and the expansion of rail routes. With such ambitious plans to upgrade the UK network dating back to 1830, coupled with a growing rail industry worldwide, expanding traffic volumes, and advancing rail speeds, it was critical that the ISO 17025 accredited test laboratory already established at TA Savery in Coventry, UK was modernised to enable a more efficient testing capability, helping modern railway networks meet exacting standards of operability, maintainability, and low life cycles costs.

Rail projects often require unique train designs due to variations in infrastructure, environment, regulations, and operating practices. Neither time nor cost permit prototype trains to conduct crash testing, so standards such as EN15227 look towards simulation, correlated against physical test to verify performance. At the same time, crash energy management systems are becoming increasingly complex, incorporating anti climbers, buffers, couplers and crush elements. TA Savery group provide sophisticated simulation of collisions to evaluate crash energy management systems along the train as well as energy absorption devices that are correlated by over thirty years of testing, accredited since 2013 to ISO17025 and audited by UKAS (UK Accreditation Service).

THE CHALLENGE

As a major supplier of rail and lift buffer components, test is an essential part of the TA Savery group's offering. TA Savery's existing test facility was tired and required ongoing human intervention to keep tests running, which was time consuming and inefficient, so a major upgrade to cope with the increase in both volume and complexity of tests was required.

TA Savery's project team planned an ambitious new Structural Test Laboratory, with capability to offer characterisation, strength and fatigue testing to 10,000,000 cycles, based around a 6m x 6m bedplate, 5 tonnes fixture



capacity, an energy efficient variable flow hydraulic power unit, closed loop control software and servo valves, high accuracy actuators rated up to 3000kN with an additional new fixed bed horizontal test machine capable of up to up to 2000kN compression and 1000kN tension loading.

TA Savery already has a long established and close partnership with Moog, working together to deliver hydraulic power packs and actuation systems for large scale testing on components such as aircraft wings and wind turbine blades using the Moog test controller as a basis for undertaking repeat testing.

THE SOLUTION

The Moog team lead by Kevin Cherrett, (Business Segment Manager for Test in the UK) worked in close partnership with the TA Savery Engineers to create the optimum test laboratory with considerable time spent by both parties in detailed discussions around the scope and ultimate implementation of the solution. Flexibility in configuration and the ability to run several different tests simultaneously was the main objective.

Key to the offering was the Next Generation Moog Test Controller with two channels of closed loop control, a processor unit and 2 manifold switching units, as well as cable sets for 2 actuators and 3 channel software licenses. To ensure maximum effectiveness, Moog recommended the installation of two workstations to enable one workstation to be dedicated to each test setup to prevent screen crowding and potential confusion. Moog also provided support to assist with the initial set up of the system as well as training. Moog replaced old Servo Valves (fitted to current TA Savery designed and built low friction test actuators) as part Moog's legacy exchange scheme enabling TA Savery to benefit from the latest valve technology. Savery Hydraulics designed and built a new Hydraulic Power Unit, incorporating a Moog RKP Radial Piston Pump.

BACKGROUND TO TA SAVERY

TA Savery can be traced back to the birth of the industrial revolution, 1698, when Captain Savery patented the world's first steam engine to lift water from Cornish mines in England. Today, the company comprises of several divisions including the TA Savery test laboratory, Savery Hydraulics, DigitalTrains™ and Oleo International.

Oleo International provides crash energy management systems with over a million Oleo hydraulic and deformation impact energy absorbers in daily operation around the world. From the world's tallest buildings protecting elevator passengers to meeting the latest requirements for levels of protection for railway passenger and freight rolling stock and operating needs such as higher coupling speeds. Back in 1934, a novel design of undercarriage strut using a free-floating piston was devised, making a lighter arrangement but more importantly enabling the strut to work at an angle eliminating the problems of oil loss & oil and gas mixing. This design eventually led to the other Oleo applications such as the Oleo Elevator buffer, Oleo industrial buffer and the Oleo rail buffer & capsule – a self-contained hydraulic energy absorber for railway rolling stock, establishing Oleo as market leaders in energy absorbing technology.

DigitalTrains™ relies on the pedigree of real testing and applies it in the virtual environment to create a virtual, digital twin of railway projects for the entire rail industry and rail networks across the globe. This allows for the continuous improvement in the development of railway projects, maximising project efficiency whilst reducing costs.

THE RESULT

TA Savery were able to upgrade their testing capability from a very tired and dated facility to a prestigious state-of-the-art laboratory with enhanced performance, capability, automation and greatly improved long term support infrastructure.

TA Savery can now confidently offer repeatable accurate testing using industry standard hardware and software, together with the back-up of Moog expert engineering to provide a comprehensive test house capability attracting test work packages from both internal areas within the TA Savery organization and test work from external customers.

As a result of the success of this facility the TA Savery team are currently evaluating proposals for a second, repeat set of equipment effectively doubling their test capacity.

THE BENEFIT

Apart from TA Savery having access to a new clean test facility, it has paved the way for safe and repeatable testing 24/7. The Lab Manager said "We used to have to stay with the test in the past, with a hand on mechanical levers, which was very labour intensive, keeping a watchful eye on the tests. Leaving a test to run over the weekend was not an option. Now we can go home knowing that the testing is safe and predictable enabling us to complete the test cycle in less time, increasing our productivity".

In addition, the noise levels in the laboratory have dropped significantly and a redesign of the layout has enabled the team to deliver more tests within the same space and an ability to change tests over within in a day allowing more focus on their other project of creating a digital twin of their test facility within the DigitalTrains™ software environment.

Moog delivered on time and on budget a brand-new test system, ensuring that training and support was in place to speed up implementation. Moog always aim to stay involved with any of their solutions and work together with their customers to ensure that the equipment remains in optimum condition and any training or support required is available when needed.

The facility has now been operating successfully since early 2022 and was showcased as one of the technical visits during the 2022 World Congress on Railway Research in Birmingham, UK.

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