Testing

Electromechanical ad hoc

Enhance Soil testing automation and accuracy with all-new Wykeham Farrance Electromechanical Servoactuated systems

Controls Group have recently introduced innovative Electromechanical Servo-actuation Technology (EmS). It has been designed for Soil testing needs and is at the core of an all-new range of automatic machines that deliver great benefits to users. This valuable range comprises automatic equipment for: consolidation ACE EmS, direct and residual shear SHEARMATIC EmS, static triaxial and stress path AUTOTRIAX II, cyclic triaxial DYNATRIAX EmS. Featuring better performances than pneumatic systems, EmS removes the need for large, noisy, power consuming air compressors and air treatment devices. Compact, affordable, easy to use and with minimal impact to the environment, EmS constitutes a great leap-forward in the world of automatic soil testing.

THE PAST: PNEUMATIC SERVO ACTUATION

The automation of Soil Mechanics testing equipment was initially adopted for dynamic tests as the need for repeated load or displacement cycles, even at low frequency, could not be achieved with manual systems and required feedback-driven control systems, typically closed-loop. Closed-loop servo controlled systems were based on pneumatic technology for simple reasons:

- Pneumatic devices were widespread and as such laboratories and workshop were often equipped with a compressed air line. Cost of a compressor and air treatment devices could then be shared among several machines;
- The cost of motor-driven devices was prohibitive and their performances did not match those achieved with pneumatic servo actuation.

TODAY: DISCOVER WYKEHAM FARRANCE EMS SYSTEMS

For almost 70 years, Wykeham Farrance has been at the forefront of geomechanics developing advanced soil testing systems. Today it is a Division of CONTROLS Group, global leader in Testing Equipment for construction industry, and it is continuing its pioneering tradition of innovation and cutting-edge design with a new market-leading range of automatic EmS equipment that is high performing, easy to use, affordable therefore matching both Research and Commercial laboratory's needs.

EMS AGAINST PNEUMATIC TECHNOLOGY

EmS technology relies on a range of state-of-the art brushless-motor actuators designed around soil testing requirements, they are highly efficient, cost-effective and competitive against any other type of actuation. Delivering superior performances in term of speed, acceleration, reactivity and load/displacement pace accuracy they are better performing than any pneumatic system.

In the meantime, the use of compressed air has become more expensive and as a result, less desirable. Involving large and costly compressors that generate noise and vibrations, pneumatic technology not only requires expensive air treatment but is also inefficient and power-hungry. Based on conversion of rotational to translational motion by mean of a super-low-friction ball-screw, EmS is highly optimized to apply alternating displacements or forces at high frequencies of tens of Hz, largely exceeding soil testing requirements. The ball screw device is backlash-free to deliver high accuracy also in case of alternating through-zero cycles.

Associated EmS Benefits

Wave-shape fidelity is far superior to any pneumatic actuator and compares to expensive servo-hydraulic systems. Furthermore with pneumatic systems the peak-to-peak max. amplitude drops as frequency increases whereas, with EmS it remains constant resulting in better wave shapes at all frequencies. The EmS screw-driven transmission guarantees an accurate, repeatable displacement control practically not affected by the applied load thus ideal when displacement control is required. The accuracy of the feedback-driven closed loop control is further enhanced by the special brushless motor driver combined with new CPU featuring stunning elaboration capacity and optimised PID algorithms, all this results in excellent load/displacement accuracy even for difficult samples with low and/or irregular stiffness.