

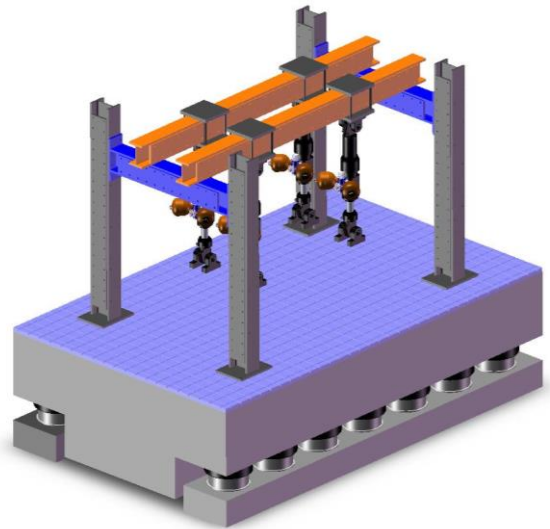
VZERO designs and supplies turnkey dynamic testing rigs according to specific customer's needs. The families of VZERO actuators, hydraulic power units and reaction frames and VZERO's unique control system are integrated to create tailored, high performance solutions.

APPLICATIONS

- Dynamic testing of civil engineering structures and components. Effective Force Method testing.
- Fatigue testing
- Testing of components from aerospace, automotive, energy and railway industries according to various regulations (IEEE, ATCP, etc.)
- Road simulation systems

KEY FEATURES

- Turnkey project approach. Design and supply of civil works, isolation system, hydraulic servoactuators, hydraulic power unit and conductions, reaction structure and control system.
- Actuator strokes up to 500 mm. Others on demand.
- Actuator loads up to 1 MN. Others on demand.
- Hydraulic power units up to 3600 liters per minute.
- Exhaustive FEM studies of reaction frames
- Frequency range: up to 100 Hz. Other frequencies on demand.
- For the most demanding applications a MIMO Advanced control system based on the operation of two simultaneous control loops: Outer Loop (OL) Jaguar® from Spectral Dynamics® and Inner Loop (IL) is used.
- Testing modules: Swept Sine, Random, Shock, Transient waveform replication, Sine on Random, Random on Random, Shock Response Spectrum



Dynamic rig for bogie testing



Four poster testing rig



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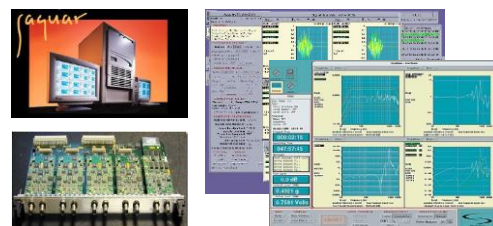
DYNAMIC TESTING SYSTEMS. SCOPE OF SUPPLY

- Civil works. Detailed design of pit, slab, retaining walls and reaction mass according to geotechnical information and local and international regulations.
- Isolation system. Design and supply of the array of vibration isolators on which the reaction mass lays. Resonant frequencies down to 1 Hz are possible. Other types of isolators are available for less demanding vibration transmission requirements.
- Reaction frames and various servoactuators supports. Exhaustive static and dynamic FEM studies are carried out to maximize first mode frequency and ensure appropriate dynamic behaviour and intended boundary conditions preservation.
- T-slotted tables for reaction structures and device under test installation.
- Design of device under test fixation tooling on demand.
- Hydraulic servoactuators. Including hydrostatic or hydrodynamic bearings to minimize friction and maximize accuracy and dynamic performance, close coupled accumulators, adjustable backlash swivels, high performance MOOG® servovalves and embedded displacement and acceleration transducers.
- Hydraulic Power Unit and accumulation system. Pressures up to 350 bar. Intelligent power consumption feature. Independent cooling and filtering circuit. Optimization of HPU and accumulation systems capacities by dynamic simulation.
- Inner Loop Controller. Inverse and Direct Kinematics solution. Individual actuator trajectory control. Advanced control algorithms: Predictive PID, System Linearization, State Space Control Schemes.
- Data Acquisition System. Highly customizable and scalable. Extensimetric, LVDT and IEPE signal conditioning.
- Outer Loop Controller: Jaguar® from Spectral Dynamics®. Advanced MIMO Degree of Freedom Control. System's Impedance Matrix online identification. Adaptive-Predictive control. Swept Sine, Random, Shock, Transient Waveform Replication, Sine on Random, Random on Random, Shock Response Spectrum. Advanced Signal Analysis features.

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Dynamic servoactuators and accessories



Inner and Outer Loop Controllers: VZERO MADC and Spectral Dynamics Jaguar®

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