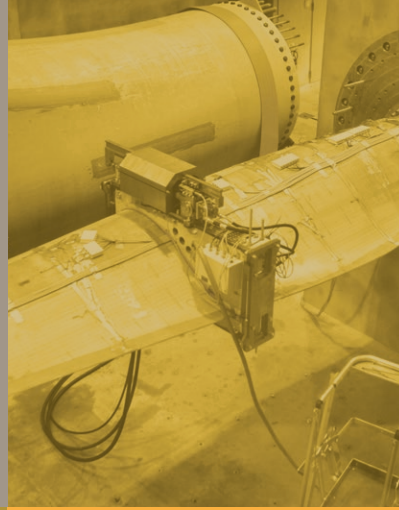


WIND TURBINE BLADE TEST SOLUTIONS

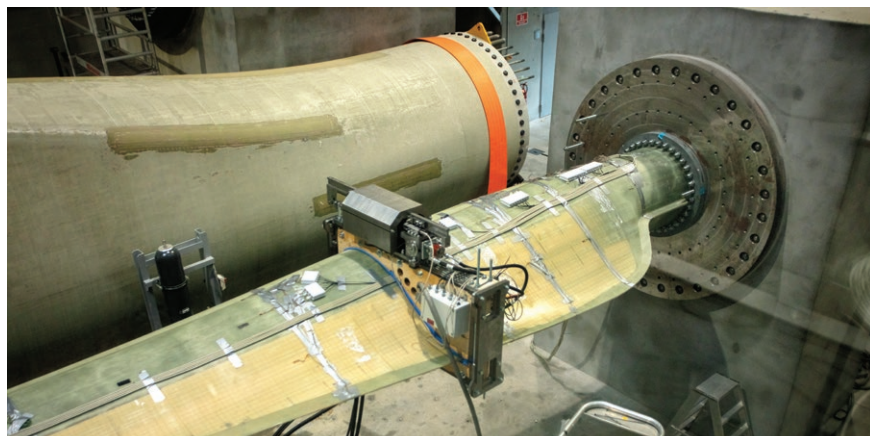
Realistic, Repeatable and Robust



Moog has developed in conjunction with its technical partners high-performance test systems to enable test facilities to deliver a flexible approach to the structural testing of wind turbine blades. Using a new range of high performance 280 bar hydraulic servo actuators complemented by Moog high performance servo valves, our flexible approach will enable test professionals to adapt as technology evolves over time, taking into account different parameters such as wind strength, blade characteristics, blade length, blade-tip deflection and profile.

Moog experience includes testing both on-shore and the latest off-shore wind turbine blades. This powerful combination is complemented with the following to deliver realistic and repeatable movement to a wind turbine blade as experienced in the field of operation:-

- Mass Resonance Exciters (MRE) – moveable masses that are designed to be attached to a blade and will excite any resonances within the blade. Multiple sizes are available, with the same basic layout of a hydraulic actuator controlled by a Moog servo valve, with a mass fitted to a sliding carriage that is operated by the rod of the actuator. The mass consists of a number of weights and the number of these weights can be changed to provide a different mass for different test configurations.
- Forced Excitation Fatigue Rated Linear Actuators - attached between the blade and a fixed point. Their movement will also excite the blade into resonance. Incorporates a safety manifold, load cell, position transducer and Moog Servo Valve. A variety of stroke lengths and force range are available to suit all blade designs from onshore through to the longest offshore blades.
- Axial Hydraulic Winches – winches attached to the blade using ropes and pulley systems. They act to statically test the blade.
- Moog Test Controllers - perform both static and dynamic tests. Supported by software that enables straightforward test setup and user-friendly analysis of the measured data.



ADVANTAGES

- Utilises proven Moog Test controllers, software and structural testing experience
- Proven technology in many existing customer facilities
- Blades can be tested in multiple angular orientations
- Solution can conduct a wide array of tests to reflect reality of loads in the field
- Adapable hydraulic systems to test anything from dynamic testing with the system accommodating a wide pressure fluctuation to a static state - one with winches where the hydraulics could be set to meet a very low flow.
- Modelling of system requirements available given blade characteristics are provided.

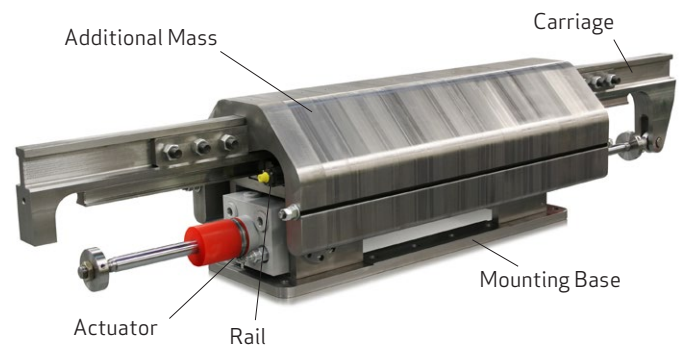
OTHER TYPICAL TEST APPLICATIONS

- Aerospace structural static and fatigue
- Automotive durability
- Civil engineering structural
- General research and development
- Materials
- Package vibration
- Rolling stock structural

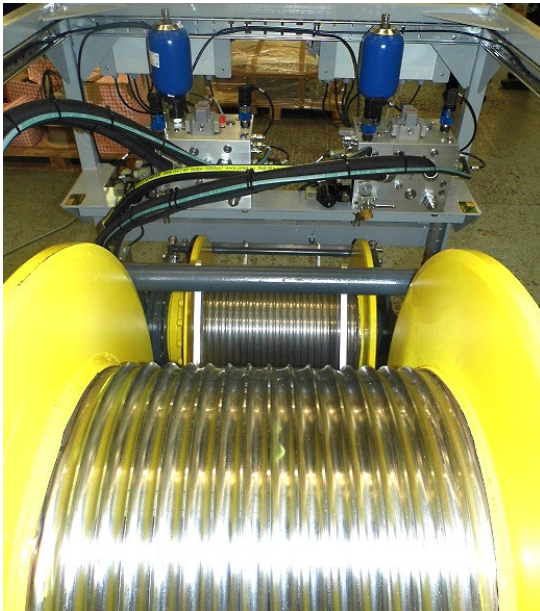
Moog Test Controller



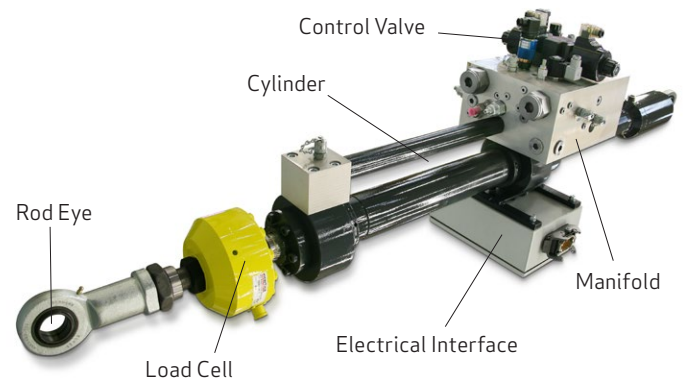
Mass Resonance Exciter (MRE)



Axial Hydraulic Winches



Forced Excitation Linear Actuator



Moog has offices around the world. For further information, or the office nearest you, contact us online.

e-mail: info.uk@moog.com

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This technical data is based on current available information and is subject to change at anytime by Moog. Specifications for specific systems or applications may vary.

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