# Automated durability tests

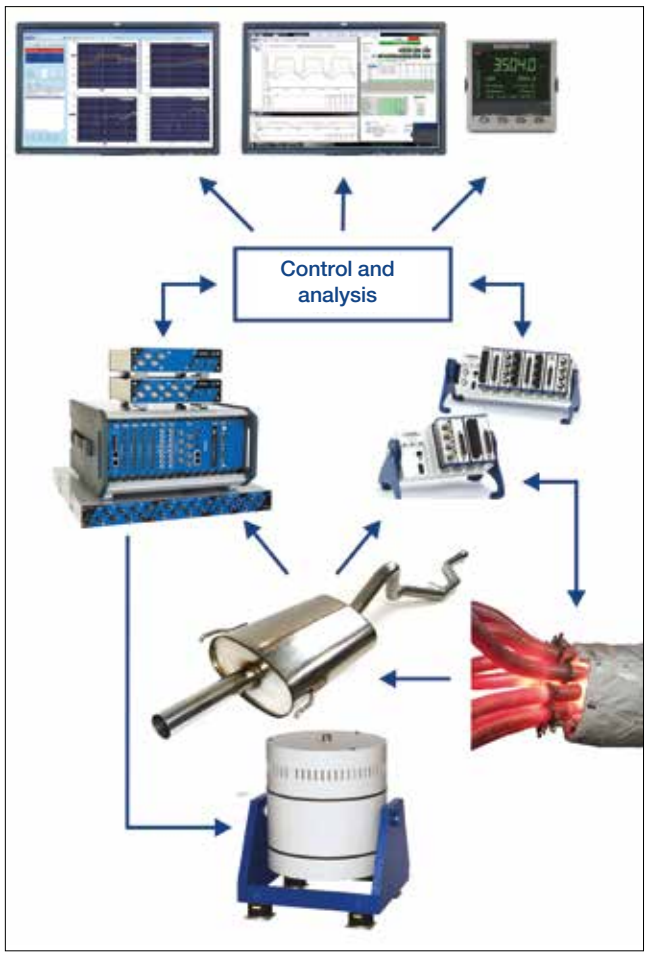
When assessing components under extremely high temperatures, an integrated solution provides automation – leading to increased accuracy, test throughput and safety

Engine and exhaust systems are exposed to extremely high temperature and vibration loads – and expected to run for many years without failure. Durability tests of these systems are performed by applying controlled vibration loads combined with very high temperatures. Such conditions are specified according to road load data acquired through test drives.

Operating and controlling the system that duplicates these conditions can be a challenge. It requires an electrodynamic vibration exciter, a burner system that produces the hot gas flow for bringing the specimen to operating temperature and a data acquisition system. The vibration control system must apply the correct vibration profile while data such as acceleration, temperature, gas flow and pressure is acquired and monitored to establish limits.

m+p international's vibration controllers have been used for many years to integrate external devices such as chambers, blowers, amplifiers and functional test equipment. m+p international provides a new integrated solution for combined durability testing, with a single user interface to control the entire system.

At the heart of the system is the hot gas generator. An OPC remote control interface was provided for the temperature controller to attain and monitor accurate temperature and flow profiles and to guarantee that the specifications are followed. Additionally, a multitude of data channels, including thermocouples, pressure, voltages or digital conditions, are captured and monitored continuously using National Instruments hardware. This ensures that the correct skin temperature or average temperature of selected locations and other specified conditions are reached before the vibration test begins. Simultaneously the vibration profile, which could be pre-specified random tests or profiles from road load measurements can be chosen, applied and precisely controlled via the m+p international VibControl vibration controller.




m+p international's integrated system for automated high-temperature durability testing

Several vibration labs have equipped their durability test rigs with m+p integrated control, data acquisition and monitoring systems, thereby providing a single point of control for reliably performing tests in high temperatures. This single interface working with the hot gas generator, the vibration controller and the data acquisition system enables any signal in the system to be permanently recorded and checked – if the test is out of tolerance, it is aborted. Increased automation boosts testing throughput, repeatability and test accuracy, and offers unattended true 24/7 operation with immediate feedback. Remote access enables the user to see what may have stopped the test.

Albert Luo, director of Dynamics Vibration Testing (DVT) in Springfield, Illinois, says, "We have used all the available controllers on the market and m+p provides the only integrated hot vib system with a best-in-class single and multiple axis controller. m+p truly listens to the customer." DVT has a unique capability, with two 35-ton shakers, a 7-ton 3DOF shaker, temperature chambers and two hot gas generators. DVT relies on m+p solutions for meeting all its customers' test needs – no matter how challenging they may be. ❮