Application Note

Shock Accelerometer Calibration at SIRA

- Test & certification company
- Shock calibration
- UKAS accreditation

- m+p SO Analyzer dynamic data acquisition, analysis and reporting system
- m+p VibPilot measurement frontend

Sira Test and Certification, one of the UK's leading testing and certification organisations, is using the m+p VibPilot frontend and m+p SO Analyzer dynamic measurement software to offer transducer shock calibration to BS ISO 16063-22 alongside the more traditional sine methods. It is unique in the UK for offering UKAS accredited calibrations for these services together.
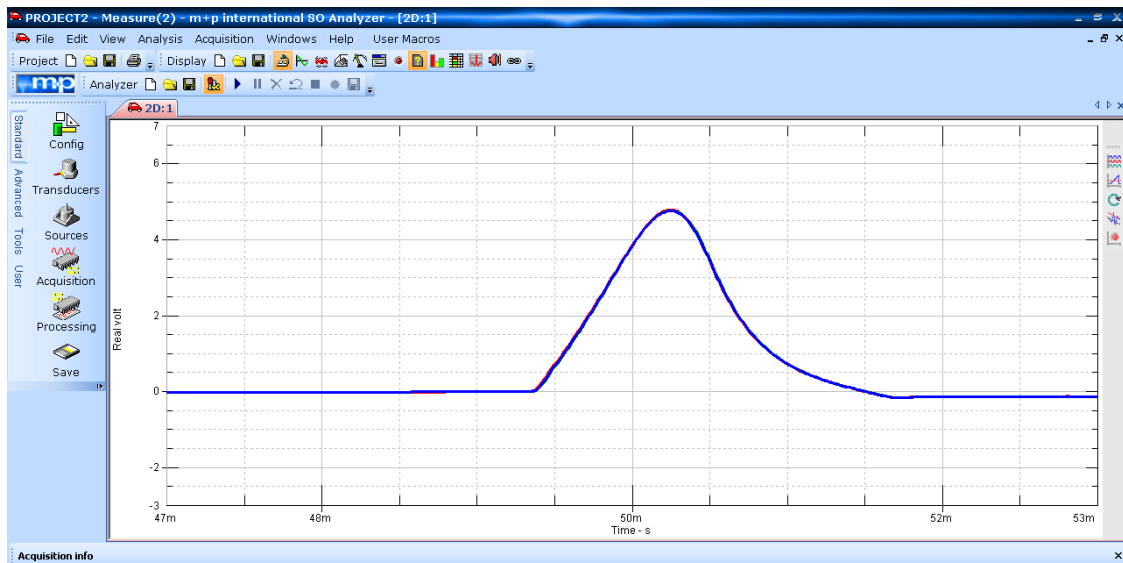

The Sira shock absorber

Shock testing is an important tool for assessing the response of a product or component to a short-duration, high-acceleration impulse caused by, for example, being dropped, jolted, impacted by another object, or as a result of an explosion or earthquake. Shock testing systems normally use accelerometers specifically designed to withstand shock to measure the response of the equipment under test (EUT) to the applied shock pulse.

Accelerometers are traditionally calibrated against a traceable reference using sinusoidal excitation over a defined range of discrete frequencies but this does not represent a realistic representation of the conditions generated by mechanical shock. Accelerations caused by shock can be very large, easily exceeding 50,000 ms-2 (5,000 gn), and capable of stressing the transducer into its non-linear region of operation. In addition, shock pulses can contain frequency components (harmonics) which are not included in the sinusoidal test frequencies. The result is that the calibration measurement uncertainty using sine waves only is significantly increased.

One solution is to use a half-sine pulse, defined by its duration and peak acceleration, a method which gives a much closer approximation to real-world shocks.

Shock pulse recorded with m+p SO Analyzer

In 2004, SIRA's Calibration Services department began to develop a half-sine shock transducer calibration facility. After assessing various products they selected the m+p VibPilot measurement frontend and m+p SO Analyzer dynamic data acquisition, analysis and reporting system as their preferred solution.

m+p VibPilot frontend

Factors which influenced this decision include:

- Easy-to-use flexible system software providing rapid configuration for each test set-up.
- Simple measurement operation giving improved test efficiency, lower costs and higher throughput.
- The system's dynamic range, measurement stability and repeatability (the calibration of the system has not changed over five years' usage).

- Comprehensive data export facilities, including custom templates and export to popular Microsoft Office applications.
- m+p international's continuing technical support to ensure a high quality system which met their stringent requirements.

SIRA issued the UK's first UKAS Accredited Shock Calibration Certificate in 2008. The company offers accelerometer shock calibration in the range 200 – 50,000 ms-2 (20 – 5,000 gn) alongside traditional sinewave calibration. The system has been very successful and in 2012 the company updated the system with the latest versions of m+p VibPilot and m+p SO Analyzer.

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