

GEOMEDIA RESEARCH AND DEVELOPMENT

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Free-Free Resonance Core Tester

FFRC-A Specifications V1.1

General Description

The FFRC is a laptop computer peripheral used for measuring the stiffness of base and pavement material cylinders and core using seismic wave resonance techniques. The FFRC is simply set on a flat surface of the cylinder and a computer-controlled electrical solenoid source initiates highly repeatable seismic waveforms that are recorded on an integrated accelerometer. Two additional discrete accelerometers may also be recorded. These waveforms are digitized and transferred back to the computer for analysis. The waveforms can be interpreted using standard FFRC modal analysis. One-button hit initiates acquisition and interpretation, with results in less than 30 seconds. The FFRC is attached to a USB port of a personal computer. The typical

package includes the FFRC, a 15' USB port cable, a supporting laptop, a polyethylene or aluminum shipping case, and a software/user manual installation CD.

Source/Sensor Specifications

- Electrical solenoid source: computer controlled.
 - Solenoid source operates on 24 volts/150 ma, driven by TTL level logic,
 - Surface contact with rounded aluminum foot in the frequency range of 500 Hz – 10 kHz,
 - Spring-loaded cylinder suspension gives reliable coupling without surface preparation.
- One integrated sensor accelerometer
 - Sensor spaced 1.5" from the source,
 - 100 mV/g sensitivity, resonant frequency > 40 KHz, 2 ma excitation,
 - Spring-loaded cylinder suspension gives reliable coupling without surface preparation.
- Two external BNC connectors with 2 ma current sources for supporting accelerometers.
- Dimensions and weight: typical size is 6 lbs, 9" x 4" x 4".

Data Acquisition Electronics Specifications

- Low-current sleep mode for portable laptop computer operation.
- USB port data transfer and 5V/480 ma power interface to a personal computer.
- Two logic-level source control channels sourcing 20 ma at 5 volts.
- Four transient analog data acquisition channels with:
 - Automatic software-controlled gain ranging from 0.1 to 10,000
 - Automatic software-controlled band-pass filters of 200 Hz–5 KHz, 2 KHz–40 KHz,
 - Sampling speeds from 20 kHz to 390 kHz per channel,
 - Up to 16,000 samples per channel in memory during high speed burst sampling.
- Three 2 ma transducer excitation with a signal range of 0-24 volts.
- Two low-speed 10 Kohm bridge transducer channels for temperature sensors.
- Triggering of data acquisition from the computer or solenoid accelerometer.
- Delta-sigma A/D with DSP insures a minimum dynamic range of 72 db at 50 KHz.

Software Specifications

System Requirements: Pentium CPU or higher with 64 Mbytes RAM, 10 Mbytes disk space. Microsoft Windows 95/98/ME/2000/XP operating systems. Data acquisition hardware and software require one USB 1.0 port.

- Acquisition Module: automated acquisition of waveforms with gain adjustment, quality control on signal repeats, software selectable number of waveform repeats.
- Interpretation Module: interactive or automated resonance peak interpretation.

Warranty

One year limited warranty covering any defects in workmanship or materials. Software and estimates derived from the software are not warranted to be free from defects.