

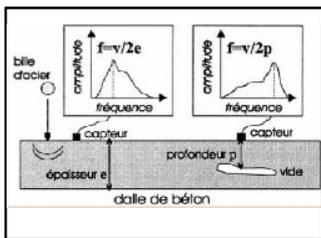
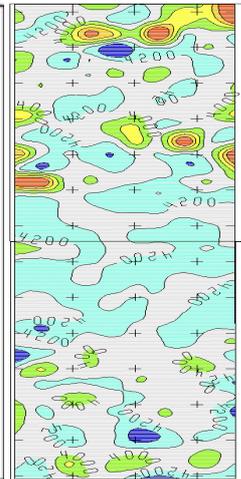
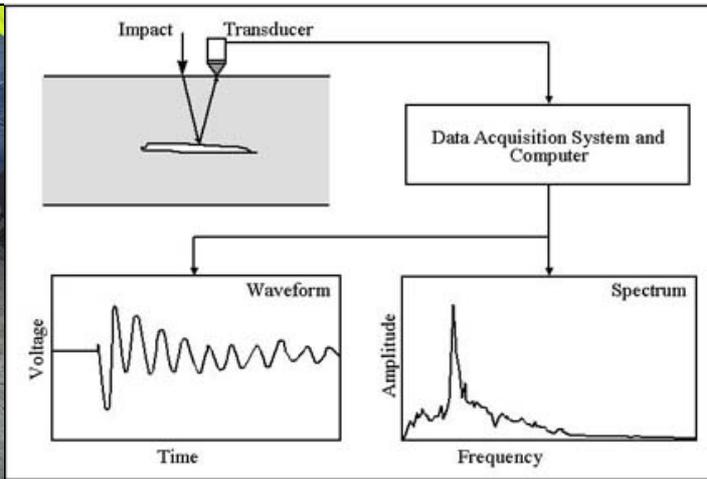


# IMPACT-ECHO

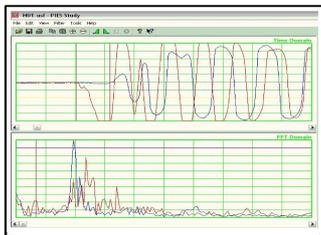


**SOLDATA**  
GEOPHYSIC

ASTM Standard C1383-98a



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Impact-Echo is a non-destructive inspection method for concrete and masonry based on the propagation of an acoustic shock wave in the structure to be investigated. Defects and interfaces in these structures will modify the propagation of this wave and, in this way, can be detected.

### Applications

Validated by ASTM, the Impact-Echo method can, without affecting the integrity, be used for:

- Carrying out measurements of the thickness of concrete slabs
- Locating and evaluating the size of defects such as cracks, delamination, voids and alterations in concrete structures (normal, reinforced or pre-stressed concrete)
- Surveying pavements and sidewalks (voids in the sub grade), masonry structures whose bricks or stones are sealed with mortar (thickness, cracks and voids, etc.)

The presence of steel reinforcement in structures does not affect the effectiveness of the method.

Small shock waves are generated at the surface of the structure by a steel sphere. The interfaces and defects in these structures reflect these waves to a sensor located on the surface near the point of impact. The spectral analysis of this curve (Fourier Transform) allows the associated frequency - amplitude graph to be obtained. The dominant frequencies, appearing as peaks in the spectrum, are associated with multiple reflections of the shock wave in the structure or to particular vibrations in the thin or dissociated layers.

To determine the depth of a defect or the thickness of a structure, the speed of the wave must be known. The system can also be used with 2 sensors on a standard spacing strip (300 mm) which allows any ambiguity of speed to be removed.

The results can be provided as a plan showing the thickness of the structures (related to the geometry of structure) or a plan of seismic propagation speeds (related to the "mechanical quality" of the structure).



### Legend

1. Principle and mapping of Vp average speeds
2. Principle of the technique
3. Example of impact echo signals

### Key figures

- Sampling rate: 10 KHz to 2 MHz
- Number of samples: 1024 to 4096
- Sensor mode: single or dual
- Gain reception: up to 70 dB

### SDG Equipment

- 2 piezo ceramic transducers
- Digitizer for sampling
- PDA for data acquisition
- Impactors (3.2 / 6.4 / 9.4 and 12.7 mm)
- Batteries